PROFILE OF OCCUPATION RELATED OCULAR TRAUMA- AN OBSERVATIONAL STUDY IN A TERTIARY CARE REFERRAL INSTITUTION

SUBMITTED BY

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DISSERTATION SUBMITTED TOWARDS PARTIAL FULFILLMENT OF THE RULES AND REGULATIONS FOR THE M.S.BRANCH III OPHTHALMOLOGY EXAMINATION OF THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY TO BE HELD IN MAY, 2018

BONAFIDE CERTIFICATE

I declare that this dissertation entitled 'Profile of occupation related ocular trauma- an observational study in a tertiary care referral institution' done towards fulfillment of the requirements of the Tamil Nadu Dr. MGR Medical University, Chennai, for the MS Branch III (Ophthalmology) examination to be conducted in May 2018, is the bonafide work of Dr. Jophy Philips Cherry postgraduate student in the Department of Ophthalmology, Christian Medical College, Vellore.

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ANTI-PLAGIARISM CERTIFICATE

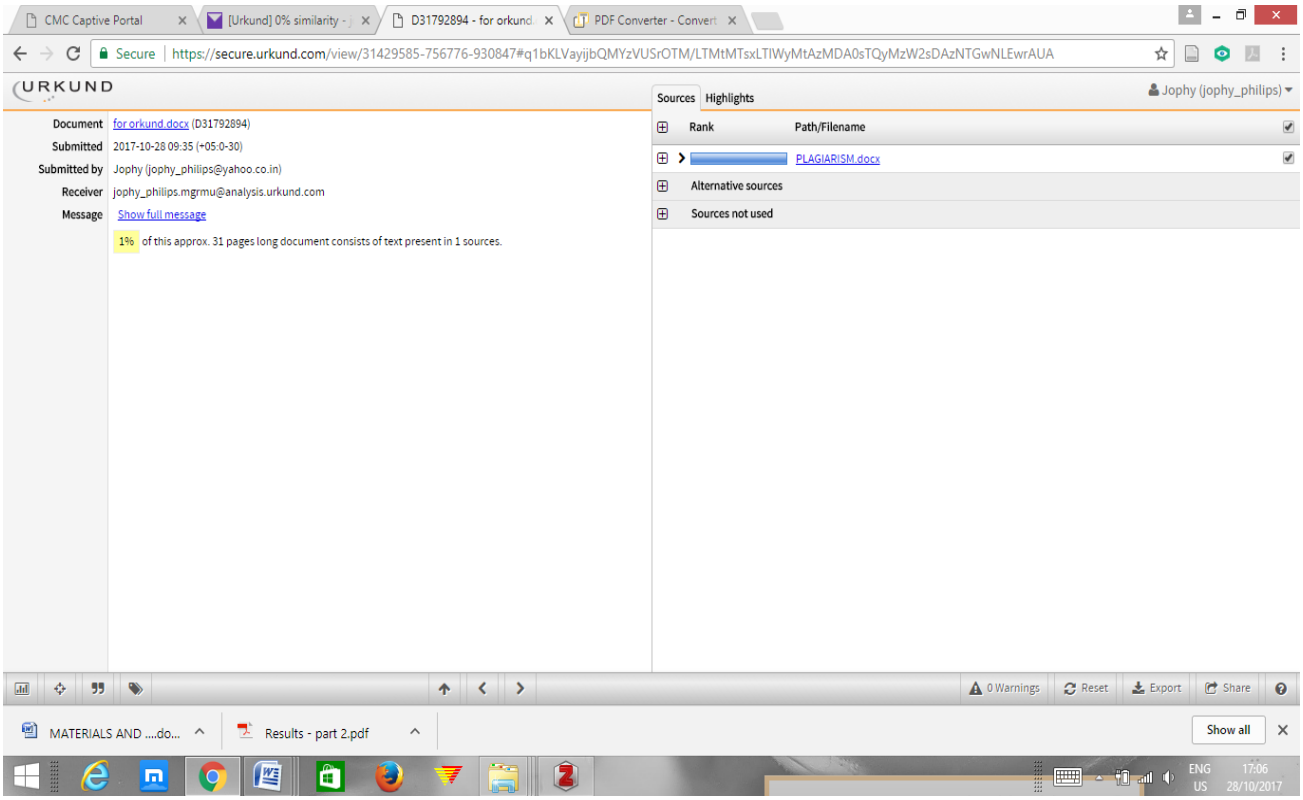

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TABLE OF CONTENTS

INTRODUCTION

Ocular trauma is a noteworthy cause of preventable blindness. It is a grave and major public health issue world over. Ocular trauma is one of the most common causes of ophthalmic morbidity and monocular blindness throughout the world.(1)

The WHO estimates that globally 55 million eye injuries occur each year restricting activities for more than a day with 750,000 cases requiring hospitalization which includes 200,000open globe injuries. There are approximately 1.6 million blind people from injuries, additionally around 2.3 million people with bilateral low vision resulting from ocular trauma and almost 19 million people with unilateral blindness or low vision(2)

The age distribution in ocular trauma is bimodal with a peak incidence in young adults followed by elderly(3,4) The male to female ratio has been found to be 4:1 world over(5–7)

A one year retrospective study of 165 patients presenting with ocular trauma done in a tertiary level hospital in Kumaon region of Uttarakhand state in India attributed 33 (20%) cases to be occupation related hazards (M:F – 10:1). Road Traffic Accidents accounted for maximum number of cases, 54 (32.7%) followed by sports, playing and recreational activities with 42(25.5%).Domestic accidents and violence related trauma were other identified causes. The most common material accounting for trauma was found to be wooden stick in 27 (16.7%) patients followed by stone in 18 (10.9%), finger nail trauma, fall from height and playing with ball in 6 cases each. Other miscellaneous modes of injury included fire cracker

injury, injury with hot oil, blunt trauma and iron rod. Open globe injuries were more common than closed globe injuries(8) in their study.

A one year prospective hospital based study of 88 patients(and103 eyes) presenting with ocular trauma to Ophthalmology OPD and emergency services in Dehradun showed 37% of ocular trauma due to Road traffic accidents and 33% occupation related, in the work places.23.86% occurred in Industrial workers, and 15..9 % occurred in labourers and farmers. This included mechanics, welders and general workers. An alarming fact was that none of them reported wearing any protective devices while working(9) Lack of wearing protective eye devices have been identified as major risk factor in studies done in Korea and Nigeria also(10,11)

A study done in Turkey to evaluate Quality of life (QOL)in patients after ocular penetrating injuries points out to poorer vision and decreased health related QOL than healthy subjects. Deterioration in quality of life may lead to psychiatric disorders prompting requirement of psychiatric evaluation in such patients(12). They may experience deterioration in social functioning which leads to decreased labour in workplace. Many patients with vision loss do not continue with their employment, may need to change their occupation or obtain disability certificate.(13)Thus QOL is severely impaired. Schrader et al, evaluated patients with trauma causing open eye injuries and its impact on the work, QOL, and emotional well-being of patients thereafter. It was reported that QOL was negatively affected in patients with ocular injuries. However, information about questionnaire was not reported in their study(14)

In China, a 5 month long prospective study was done to assess the vision related quality of life in patients with ocular chemical burns with the aid of a 25- item National Eye Institute Visual function Questionnaire. The study showed that those who had ocular chemical burns had a significant and extensive impact on visual function and vision related Olathe study demonstrated that patients with binocular visual impairment reported greater difficulty in carrying out daily activities and had poorer vision related QOL than those with uniocular visual impairment(15)

A 3 month long prospective study carried out in Singapore revealed interesting facts. Work related eye injury was the most common setting for ocular trauma in Singapore, accounting for more than 70% of all ocular trauma cases. The construction industry was the most common setting for occupation related ocular trauma and grinding, cutting metal and drilling were the specific activities at the time of injury in 90% of the cases. Ananalysis of eye protective devices (EPD) devices was conducted in patients with occupation related ocular injuries. Out of 590 cases, 61 were excluded as eye protective devices were not considered appropriate for work related activity at the time of injury(eg. ocular injury as a result of fall at workplace).Only 115 (21.7%) used some form of EPD, another 231(43.7%) did not wear EPD at the time of injury though they were provided with those. The remainder, 183(34.6%) reported that they were not provided appropriate EPD. Eye protective devices were shown to be associated with less likelihood of hospital admission (11%) or follow-up requirements as compared to those who did not wear eye protective gear (20%). It was deduced that a significant number of occupation related eye injuries occur in well- defined, predictable and consistent activities and settings. Hence it is imperative that work related

activities/occupations where EPD should be used be identified. A high proportion of all occupation related ocular trauma cases were significantly minor (eg: superficial foreign body and corneal abrasions, which accounted for 80% of ocular trauma cases) and are therefore preventable by strict use of eye protective devices. The results also cited non availability of eyewear as a reason in 44% and non-compliance in 35% with regard to use of EPD. Work related injuries were associated with higher socioeconomic implications including direct cost of medical care, indirect costs like time off work, loss of income and long term disability. (16)

A previous study in our institution described the profile of 379 patients who came to emergency services between July 2004 and January 2005, with history of ocular trauma or foreign body in either eye and within 2 weeks of the date of presentation. Work related trauma accounted only for 22.4% of patients. The “stick” predominated as the premier object of insult (22.2%) and Vegetative matter 10.4%. The “stick” was the most common object of injury. Clinical profile showed a high incidence of open globe injuries (19.3%). The predominant occupation in rural India was agriculture and the premier form of fuel used in most households for cooking was firewood. Thus the results showed a high percentage of ocular trauma related to sticks and vegetative matter.

Our institution is situated in the city of Vellore which is the capital of the Vellore district, one of the largest districts in Tamil Nadu, situated in the northwest corner of the state. It is geographically situated strategically on the major roadways connecting Chennai and Bangalore.

All along the highway are industrial towns with leather, automobile, engineering and manufacturing, precision tool, explosives and service sector industries. There are industrial parks also located dotting the stretch from Arakonam to Vaniyambadi. Leather industries cluster to the south west region of the district. Apart from the organised sector, there are a myriad of small scale industries, small unorganized sectors like the stone quarries, sand mining in the river bed and workshops along the highways for vehicles doing repairs. Many of these have unskilled labourers, working late hours and with minimal wages as they are the unregulated or small scale industries. India is the second most populous nation in the world with a growing economy with rapid industrialization and globalization. The working age group constitutes about 64% of its population, following China and it is known that only 10% work in the organized sector. Vellore follows a similar pattern as the rest of the country.

Based on past studies in the country, state and within our institution, a proposal was written to study in detail the occupation related trauma in a more detailed manner and understand the profile of occupations, injuries to the extraocular structures and intraocular structures, awareness of safety and protective devices and visual impairment following injury. This would then help us initiate a public health approach in decreasing the prevalence of a preventable cause of visual impairment and blindness.

AIM AND OBJECTIVES

AIM

To study the profile of patients presenting with occupation related ocular injuries to the department of Ophthalmology, Christian Medical College, Vellore

OBJECTIVES

1. To describe the profile of occupations related with ocular injury

2. To describe the profile of ocular injuries occurring in occupation related trauma

3. To describe risk factors associated with occupation related ocular injuries

MATERIALS AND METHODS

Study Design:

This is a hospital based observational study.

Study Name:

Profile of occupation related ocular trauma– An observational study in a tertiary care referral institution.

Study setting:

The study was conducted in the Department of Ophthalmology, Christian Medical College,Vellore - A tertiary care referral teaching centre in South India. The number of patient footfalls in the outpatient clinics of the department averages 500 – 600 per day. The average number of patients admitted weekly in the outpatient wards of the department is 160.

All patients, above the age of 18 years, who have had ocular trauma and presented to the d within 1 month of sustaining trauma from January 2017 to August 2017 and willing to be a part of this study were included. Patients who presented in casualty and outpatient section of the department were recruited. Those patients who presented with ocular trauma were asked the following questions from an initial screening questionnaire –

Name of the patient-

Are you a student/staff of CMC,Vellore?

Q1. Where did the eye injury occur?

a. At the place of work

b. At home while doing work

c. Outside home and workplace

Q2. When did the eye injury occur?

Specify time and date

Q3. What is your age?

A. below 18 years

B. 18 years and aboveStaff or students of the institution were excluded as they were included in another study being conducted during the similar time period.

Patient selection: Participants of the study were selected based on the following inclusion and exclusion criteria. They were then recruited after obtaining informed consent.

Inclusion criteria:

1. If they are above the age of 18 years.

2. Was the eye trauma at your work place or work related?

3. Whether the injury occurred within 1 month of presentation to department.

4. Whether they are staff/students of CMC Vellore.

Exclusion criteria:

1. History of ocular trauma not related to the participant's occupation.

2. History of ocular trauma more than a month prior to the date of presentation.

3. History of ocular trauma occurring within the person's home environment.

4. Housewives who have trauma during cleaning or cooking.

5. Staff and students of Christian Medical College.

Methodology:

The initial screening questionnaire was administered by the casualty on call doctor for patients who presented to the casualty. The same was administered by the respective doctors when the patient presented to OPD. Vision recording was done by the optometry staff or students as per department protocols.

Patients who presented after OPD, casualty hours were screened using the initial screening questionnaire by the duty-doctor or the principal investigator. The principal investigator then checked if the study criteria was met or not and then administered the questionnaire after having obtained the informed consent. Those willing to be a part of the study were recruited. The questionnaire was used to determine the demographic, socioeconomic and occupational profile of patients.

The patient underwent a detailed ophthalmic clinical examination and appropriate investigations to aid the diagnosis and management. Examination included a preliminary torchlight examination followed by a detailed anterior segment examination using the slit lamp biomicroscopy. Intraocular pressure was recorded with the help of application tonometry whenever applicable. Dilated fundus examination was carried out with slit lamp bio- microscopy and indirect ophthalmoscopy. An ultrasound (B scan) was done for patients in whom dilated fundus examination was not possible and for those patients in whom view to fundus was not appreciable. Investigations were carried out if indicated.

The ocular trauma was assessed and scored using the Ocular trauma score at the time of initial presentation was estimated for those with open globe injuries.

Following this the patient was treated as required in the department at their own expense. Management of patients was done as per department protocol mandates. Following the appropriate management of the ocular trauma, patient was followed up as required in the outpatient department at regular intervals.

The patient was reviewed by the principal investigator at 1 month from the date of presentation to hospital. Vision was recorded (including (best corrected visual acuity if possible) using Snellen's chart and clinical examination including slit lamp examination was done as per department protocols. In the event of poor visual outcome, the cause for the poor outcome was also documented. Unaided vision and best corrected visual acuity using Snellen's chart was recorded at 1 month follow-up from the date of presentation to hospital.

In the event of the patient being unable to sign the consent form, understand the consent form or due to the circumstances of the trauma unable to consent, the caretaker of the patient was briefed about the study and consent was taken from the caretaker. The caretaker was given the information sheet in a language they understood so that they could explain the nature of the study to the participant at a later time.

The information sheet given to the participant / caretaker described the aim and methodology of the study. The information sheet was available in English and Tamil. The contents of the information sheet was read out and explained to illiterate patients. The patients were then recruited after having obtained an informed written consent.

Patient who presented with ocular trauma from January 2017 till August 2017 were invited for participation in the study.

Calculation of sample size:

Work related trauma accounted only for 22.4% of patients. The “stick” predominated as the premier object of insult (22.2%) and vegetative matter 10.4%.

The “stick” was the most common objector injury. Clinical profile showed a high incidence of open globe injuries (19.3%). The predominant occupation in rural India was agriculture and the premier form of fuel used in most households for cooking was firewood. Thus the results showed a high percentage of ocular trauma related to sticks and vegetative matter. (24)

379 patients who came to emergency services in CMC, Vellore between July 2004 and January 2005, with history of ocular trauma or foreign body in either eye, within 2 weeks of the date of presentation were included in the prospective, cross sectional survey and underwent a complete eye examination including best corrected visual acuity, slit lamp examination and fundoscopy.

The study revealed that 85 patients sustained ocular trauma at the place of work (22.4%). 50.6 (43 in number) of patients had vision below 6/18 on Snellen’s Chart.

The sample size has been calculated with the formula n = 4pq/d *d, where p is the prevalence, q = 100- p (100-50 = 50) and d is 20 % of p value (20/100 *50 = 10).

Visual impairment< 6/18 =43

Total no = 85

Prevalence of visual impairment< 6/18 = 43/85=50.6%

n = 4*p*q, where p= 50, q= 100-50 =50 and d=10

= 4*51*49/100 = 99.96

A minimum sample of 100 will be needed to detect 50% prevalence of < 6/18 visual impairment among the occupation related ocular injuries with a 95% CI and 10 % precision.

Considering a dropout of 20%, the number will be 100*20/100= 20

Hence sample size will be 100+20=120. (24)

Data entry and analysis:

Data entry was done with Epidata 3.1 software. Analysis done with Excel.

Statistical methods:

Data was summarized using mean (standard deviation)/ median (range) for continuous variables, frequency (percentage) for categorical variables.

The association between risk factors and the outcome was analysed using chi-square test if categorical and independent t test if categorical. The risk was presented as odds ratio (95% CI). The adjusted analysis was done using logistic regression and odds ratio was presented with 95% CI.

(The risk factors were: place of injury, awareness of eye protective devices at workplace, availability of eye protective devices at workplace, usage of eye protective devices at the time of incident, occurrence of non occupational injury in the past, involvement of ocular and intraocular structures during ocular trauma, details of

primary surgical intervention, age, different cause/circumstance of injury at workplace, extent of lid tear, conjunctival tear, scleral tear, height of hypopyon, injury to lids, conjunctiva, sclera, cornea, anterior chamber, iris, pupil, lens, vitreous, retina, optic nerve, globe and presence of intraocular foreign bodies.)

The incidence of trauma was calculated along with the confidence interval.

The pre and post measurements of visual acuity were analysed using paired T test.

REVIEW OF LITERATURE

"The soul, fortunately, has an interpreter- often an unconscious but still a painful interpreter – in the eye". Jane Eyer, Charlotte Bronte.

"The eyes are the windows to the soul" is an expression that is often used to describe the deep connection one feels when one looks at something joyful . Eyes are one of the most important sensory organs in the body because it renders vision and the power to see. Eyes are not only important in seeing into another persons soul, but they are also vital in how we view the world around us. Sight and vision are important because they allow us to connect with our surroundings, keep us safe, and help maintain the alertness and sharpness of our minds.

Sight is physical. It is a sensory experience in which light reflects off shapes and object and the eyes then focus this light. Signals are then sent to the brain and converted into images. The mind then interprets these images. Sight may allow a person to witness a event. Vision helps one to understand the significance of that event and draw interpretation. These 2 entities are harmonious and bring understanding and beauty into our mundane lives. They also keep us safe. Sight is inarguably the most sense for safety and self-preservation. Protecting eyesight is highly important to avoid harm. Frequent stimulation of the mind and philosophical interpretation of ones sense of vision helps maintain intelligence and health.

The right to health and safety at work has been stipulated in the Constitution of World Health Organization, Internatonal Labour Organization, United Nations, other national and international agencies. No country has so far been fully successful in achieving this objective for all workers. Occupational health infrastructures and programmes should be further developed in every country.

Occupational health is a preventive activity aiming at identification, assessment and control of work place hazards and implementing actions to ensure a healthy workplace environment for workers.

The Alma Ata Declaration emphasized the need to organize primary health care services (both preventive and curative) "as close as possible to where people live and work".

The sixtieth World Health Assembly organised by the World Health Organisation considered the draft global plan of action on workers health in accordance with the resolution WHA 49.12 which endorsed the global strategy for occupational health for all. They recognized the occupational safety and health adopted by the General Conference of ILO and other such international agencies. Together, they endorsed the global plan of action on workers' health 2008–2017 at national and international levels.

Workers represent half the world's population and contribute significantly to economic and social development of their countries. Their health is determined by workplace standards and hazards , social factors and access to health services.

Despite the availability of effective interventions to prevent occupational hazards and to protect and promote health at the workplace, large gaps exist between and within

countries with regard to the health status of workers and their exposure to occupational risks. Only a minority of the global workforce has access to occupational health services.

The objectives of the workers health global plan of action were to :

to devise and implement policy on health of workers

to promote health at the workplace

to improve access to occupational health services and enhance performance

to provide and communicate evidence for action and practice

to incorporate workers health as a priority into other policies.

Work related eye injuries significantly impacts ones health and lifestyle. It is a preventable health problem. It affects the working population and thus impedes a Nations social and economic development. It can be a burden on the country health care system and expenditure. The burden of blindness not only impacts the quality of life but also the loss of productivity associated with the remainder of blind person years.

The World Health Organisation (W.H.O) estimates that 80%of visual impairment may be prevented or cured. Hence it is imperative that individuals and the government take necessary steps to reduce incidence of ocular trauma and specifically work-place related eye injuries.

Injury is defined as physical damage to body tissues caused by an accident or by exposure to environmental stressors. Eye injuries are of particular significance as they may impair the quality of life, not to mention the loss of productivity, morbidity and even morbidity.

Occupational hazard is any existing or potential condition in the workplace, which by itself or by interacting with other variables, can result in death, injury, property damage or other loss. Quite simply, occupational hazard means potential source of harm. Occupational hazard is a danger that's inherent in a particular work requirement or environment. It is a job which entails a greater risk than that to the population at large, such as a risk of illness from exposure to toxic materials, mining disasters and the like. For instance, any injury such as a cut, fracture, sprain, amputation that results from a work accident or from a single instantaneous exposure in the work environment can be labelled an occupational hazard.

Ocular trauma is a noteworthy cause of preventable blindness. It is a grave and major public health issue world over. Ocular trauma is one of the most common causes of ophthalmic morbidity and monocular blindness throughout the world. (17)

Visual impairment following occupation related ocular trauma has shown to decrease the quality of life and lead to emotional and economic disturbances in the social context(12,14)

Use of protective devices has been shown to decrease the incidence of occupation related trauma but multiple studies have shown a poor use and a lack of awareness of protective eye wear.(16)

epidemiology

The WHO estimates that globally 55 million eye injuries occur each year restricting activities for more than a day with 750,000 cases requiring hospitalization which includes 200,000 open globe injuries. There are approximately 1.6 million blind people from injuries, additionally around 2.3 million people with bilateral low vision resulting from ocular trauma and almost 19 million people with unilateral blindness or low vision.(2)

In the United States, according to the Bureau of labour statistics, the incidence rate for non-fatal occupational eye injuries is 2.3%(per 10,000 fulltime workers) among total private, state and local government employees in the year 2015. The median loss of work is 2 days. The total number was 25,080 employees. (OSH2)

Despite safety recommendations, eye injuries continue to be a leading cause of monocular blindness.(18)

The age distribution in ocular trauma is bimodal with a peak incidence in young adults followed by elderly. (3) (4) The male to female ratio has been found to be 4:1 world over. (19),(7)

A study done in Malaysia consisted of 220 patients who sustained open globe injuries revealed that the most common cause of injury was the home (51.8%), followed by workplace injuries (23.4%)(20). Seventy six % of eyes had an initial visual acuity worse than 3/60, the visual acuity improved in about half of these patients. The visual

outcome was found to be significantly associated with the initial visual acuity (<0.005), posterior extent of wound (<0.001), length of wound (<0.001), presence of hyphaema (<0.001) and presence of vitreous prolapse (<0.005). The most common mechanism of injury encountered was sharp injury followed by intraocular foreign bodies, blunt trauma and blast injuries. According to the results of the study, 19 of the total 20 patients who had retained ocular foreign body (IOFB) had acquired laceration in the eye. Intraocular foreign body removal was possible in 17 among the 20 patients. 77 % of eyes had an initial visual acuity worse than 3/60. It must be borne in mind that blindness has a negative impact on the quality of life due to loss of productivity. (20)

A study in western Turkey showed that exposures to welding light was the most common mode of work related eye injuries (26.9%). Drilling/cutting injuries (21.1%) constituted the second most common cause of eye injuries followed by injury by chemicals or other substances (15.2%). “Foreign bodies in the eye” was the most commonly seen in this setting (30.7%). All these patients were employed in the metal and machinery industry and all had eye injuries at work place caused by splinters or particles lodged in the eye. Other reported eye injuries were burns/radiation (26.8%), eyeball penetration/laceration (15.3%) in the same decreasing order of occurrence . 51.6 % of patients (n = 421) had injury to the right eye, while 6.0% had injuries in both eyes. Drilling/cutting injuries (82.8%) accounted for the highest number among mechanism of injury leading to permanent loss in vision (7.8%). Almost all patients in this group suffered from eyeball penetration with corneal and/or scleral involvement.

Lack of protective measures (goggles and the like) could be attributed as the most common cause for workplace related eye injuries(18.7%) .172 patients pointed out that protective equipment (such as goggles and gloves etc.) were available in the workplace, though they did not use them at the time of injury (21.1%). Work related eye injuries were more common in males than in females, and males between 25 and 34 years were more prone to eye injuries. The study suggests occupational eye safety programs could be arranged focussing on specific tasks or types of work with high risk of ocular trauma, irrespective of age or sex(21)

The most common cause of ocular injuries was injury with metal objects among an occupational injury group in a study done in Chongqing, China, with 315 (69.5%) cases, followed by 34 (7.5%) cases of chemical, 27 (6.0%) cases of electric arc, 21 (4.6%) cases of hot liquid, 19 (4.2%) cases of glass, 10 (2.2%) cases of plastic, 9 (2.0%) cases of road traffic accidents and 6 (1.3%) cases of explosive exposure.(22)

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a significant number of occupation related eye injuries occur in well- defined, predictable and consistent activities and settings. Hence it is imperative that work related activities/occupations where EPD should be used be identified. A high proportion of all occupation related ocular trauma cases were significantly minor (eg: superficial foreign body and corneal abrasions, which accounted for 80% of ocular trauma cases) and are therefore preventable by strict use of eye protective devices. The results also revealed non availability of eyewear as a reason in 44% and non-compliance in 35% with regard to use of EPD. Work related injuries were associated with higher socioeconomic implications including direct cost of medical care, indirect costs like time off work, loss of income and long term disability. (16)

Welders in unorganized welding units in South India suffer from a high frequency of eye injuries mostly due to non-availability of personal protective eyewear (PPE). Welders from the lower socio-economic strata and mostly uneducated (without any formal training) are usually ignorant of safe working practices and guidelines to protect their health. Welding standards exist in India but employers of most unorganized welding units regrettably fail to adhere to the national standards. The unorganized welding sector must be brought under the scrutiny of the occupational health and safety department. The industrial governing bodies should maintain the minimum basic standard for the welfare of welders. Certain qualification criterion and pre-placement training programs for welders need to be enforced to curtail work place morbidity. Short-term training courses in welding and the implementation of a PPE awareness program are the need of the hour.(23)

A study in Vellore by Alexander et al (published in 2016) found that the use of protective eye equipment (PPE) was inadequate among the welders.(24) It was found that none of the welders neither used recommended PPE nor appropriate clothing. Further more, they worked bare-handed in contrast to finding by Bhumika et al. and Kumar SG et al. This could be due to the fact that industrial welders in their study had access to PPE, unlike the welders in the Vellore study who could not afford PPE and was not provided by their employers.(25)

A study of 98 patients with eye lid lacerations in Iran concluded that men are more vulnerable to eye lid lacerations. Men among the 29 years age group were most prone. 40 cases occurred in the street, 27 at home, and 17 cases in the workplace.

Most of them were occupied at factories, workshops or were workers in some form .(26)

A study by James Adams et al compared the effect of standard education and enhanced education for behavioural changes in stone quarry workers. Compared to standard education, enhanced education significantly increased compliance with protective eyewear by 16% at three months. Protective eyewear and enhanced education reduced the incidence of eye injuries at three months by 16%, and standard education by 13%, compared to the three months before any intervention. The cumulative reduction over baseline in eye injuries at the six months was greater with enhanced education (12% decrease) than with standard education (7% decrease).

It can be summed up that provision of appropriate protective eyewear reduces the incidence of eye injuries in stone quarry workers. Periodic educational and motivational sessions facilitates health improving behavioural patterns and promotes

sustained use of protective eyewear. (27)

379 patients who came to emergency services in CMC, Vellore between July 2004 and January 2005, with history of ocular trauma or foreign body in either eye, within 2 weeks of the date of presentation were included in a prospective, cross sectional survey showed that work related trauma accounted only for 22.4% of patients and vegetative matter 10.4%. The “stick” predominated as the premier object of insult. The clinical profile showed a high incidence of open globe injuries (19.3%). The predominant occupation in rural India was agriculture and the premier form of fuel used in most households for cooking was firewood. Thus the results showed a high percentage of ocular trauma related to sticks and vegetative matter. (28)

Classification of ocular trauma

In 1996,Kuhn et al defined various terms used in ocular injuries and classifies trauma based on mechanical eye injuries. The widely used popular classification system classified mechanical eye injuries into closed globe and open globe injuries(29).

Birmingham eye trauma terminology system (BETTS)

According to this classification, injuries were divided into closed globe and open globe injuries. Closed globe injuries were further divided into contusion and lamellar laceration. Open globe injuries were further classified into laceration and rupture. Lacerations were further subdivided into penetrating injuries, intraocular foreign bodies and perforating injuries. (30)

Ocular Trauma classification group- This classification was made according to the type of injury. Mechanical injuries of the eye are divided into open globe injuries and

closed globe injuries. Further classification is made on the basis of type, grade, pupil and zone.

Open globe injuries refer to full thickness wound involving the eyewall.. The eye wall refers to the sclera and cornea in this context, although anatomically, the eye wall has 3 coats.

Closed globe injuries refers to the coats of the eye (corneosclera) without a full thickness wound.

According to type of injuries, open globe injuries are divided into rupture, penetrating, intra-ocular foreign body, perforating and mixed type of injuries. Rupture refers to full thickness wound caused by blunt object. The eye wall gives way at its weakest point due to blunt force which may or may not be at the site of impact. Penetrating injuries refers to single, full thickness wound of the eyewall (sclera and cornea). Penetrating injuries have entry wound but no exit wound. Intraocular foreign body injury refers to retained foreign object which causes a single entrance wound. Perforating injuries refers to full thickness wounds of the eyewall (cornea and sclera); with an entry wound and an exit wound.

Grade of injuries are classified according to vision. With Snellens chart, Grade 1 consists of vision from 6/6 to 6/12. Grade 2 consists of vision from 6/18 to 6/24. Grade 3 consists of vision ranging from 6/36 to 3/60. Grade 4 with vision from 2/60 to PL. Grade 5 consists of patients with no perception of light.

Patients with presence of relative afferent pupillary defect (RAPD) were classified into pupil positive and patients with no RAPD fell in the pupil negative category.

Based on the location, open globe injuries are classified into zone 1, zone 2 and zone 3. Zone 1 consisted of patients with injuries isolated to the cornea (including corneo-scleral limbus). Zone 2 consisted of injuries involving the corneoscleral limbus to a point 5 mm posterior into the sclera. Zone 3 consisted of injuries posterior to the anterior 5 mm of sclera.

Closed globe injuries are subdivided into contusion, lamellar laceration, superficial foreign body and mixed injuries according to type. Contusion refers to closed globe injuries resulting from a blunt object wherein injuries can occur at the site of impact or at a distant site secondary to changes in configuration of the globe. It may also be due to transient rise in intraocular pressures. Lamellar laceration includes closed globe injuries of the eyewall (sclera or cornea) or bulbar conjunctiva usually caused by a sharp object. The wound here occurs at the site of impact. Superficial foreign body refers to closed globe injuries resulting from a projectile and the like. Here, the foreign body lodges onto the conjunctiva and/or eyewall (corneo-sclera) but does not cause a full thickness defect on the eyewall.

The grade and pupil classification for closed globe injuries is the same as seen for open globe injuries (described above). The zone in closed globe injuries refers to the location of injuries. The zone is again divided into Zone 1, Zone 2 and Zone 3. Zone 1 refers to external injuries, involving the conjunctiva, sclera and cornea. Zone 2 involves the anterior segment structures internal to cornea like the anterior chamber, lens, posterior capsule and pars plicata. Zone 3 consists of posterior segment structures namely the pars plana and those posterior to the posterior lens capsule.

Classification of severity of visual impairment

A classification of severity of visual impairment based on the resolution of the International council of Ophthalmology (2002) and the Recommendations of the WHO Consultation on “Development of Standards for Characterization of Vision Loss and Visual Functioning" (September 2003) categorises visual impairment into category 0-5.

Category 0 refers to mild or no visual impairment with presenting distance visual acuity equal to 6/18 (20/70).

Category 1 refers to moderate visual impairment with presenting distance visual acuity worse than 6/18(20/70) and equal to better than 6/60(20/200).

Category 2 refers to severe visual impairment with presenting distance visual acuity worse than 6/60 (20/200) and 3/60 (20/400).

Category 3 refers to blindness with presenting distance visual acuity worse than 3/60 (20/400) and equal to or better than1/60(5/300) or 20/1200.

Category 4 refers to blindness with presenting distance visual acuity worse than 1/60 (5/300 or 20/1200) and equal to or better than light perception.

Category 5 refers to blindness with no perception of light.

International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10)-WHO Version for ;2016 has classified visual impairment as stated below

0 normal- 6/6 - 6/18

1. visual impairment – <6/18 - 6/60

2. severe visual impairment : <6/60 - 3/60

3. Blind : <3/60

In 2009, Piermici proposed a new classification of ocular trauma based on ocular structures such as orbit, lids, lacrimal apparatus, conjunctiva and the like. The study aimed at classifying all types of ocular injuries and in prognosis. It is imperative to incorporate ocular injuries due to non- mechanical causes as well to appreciate the broad spectrum of eye trauma.(31)

The current classification system of ocular trauma falls short in incorporating trauma to lids and adnexa, injuries that may be attributed to non-mechanical mode and destructive globe injuries. In a study done by Shukla B et al, a new classification system was proposed. A wider range of ocular trauma has also been been included. A clinic based cross-sectional comparison study of 535 cases over a 4 year period with the conventional classification enabled them to classify all the 535 cases. The conventional classification system could classify only 364 cases only. Injuries involving the adnexa, non-mechanical injuries and destructive globe injuries could not be classified by the conventional classification system. Thus missing 33% of cases.

The current study by Shukla et al divided injuries into local and associated injuries. Local injury cases consisted of trauma limited to eyeball and adnexal structures. Associated injury cases had globe trauma with either head injury, injury to the faace, or multiple injuries called as polytrauma. (32)

Local injury group was further divided into mechanical and non-mechanical types. Mechanical injuries were classified into adnexal and global injuries. Non- mechanical injuries included mode of injury namely chemical, thermal, radiation, and electrical injuries. Adnexal injuries included orbital, palpebral, lacrimal, and conjunctival trauma. Injuries to the globe were further divided into structural and pathological types. Structural consisted of anterior or posterior segment eye injuries. Pathological type injuries were further divided into closed globe, open globe, and destructive globe injuries.

Anterior segment eye injuries consisted of injuries to cornea, anterior sclera,iris, lens. Posterior segment eye injuries consisted of injuries to vitreous, retina, choroid, posterior sclera.

According to the study, facial injuries were most common followed by multiple injuries. Among local injuries, mechanical injuries were more common than non-mechanical injuries. Globe injuries constituted the most number of injuries among mechanical followed by adnexal injuries. Destructive globe injuries were least observed during the study. Palpebral injuries were more common than conjunctival injuries among adnexal type of injuries. The most common cause of nonmechanical injury was thermal injury (45.4%) followed by chemical (31.8%) injury.

According to anatomical classification, anterior segment injuries(86%) were more commonly seen than posterior segment injuries (14%). The most common anterior segment injury was injury to the cornea (53.1%) followed by injury to the lens (27.4%). The most common posterior segment injuries were retinal injuries (43.3%) followed by choroidal injuries (11.9%).

Injuries involving the globe were classified on the basis of pathology into closed globe injury (66.7%), open globe injury (26.7%), and destructive globe injuries (6.7%) . As conventional classification included only the former two, 27 destructive globe injuries would not have been classified. The most common closed globe injury was of a contusion (66.6%) followed by lamellar laceration (17.4%). The most common open globe injury was that of a rupture (46.3%). Phthisis bulbi was the most common destructive globe injury followed by endophthalmitis (29.6%).

A demerit of the ocular trauma score is that it includes open globe injuries of the conventional classification system and it does not aid in prognostication. The Ocular Trauma Score was designed to predict visual outcomes in open globe injuries. (30) It does consider adnexal injuries. Pure adnexal injuries are unlikely to affect visual outcome though it may lead to problems with cosmesis. BETTS can be used to describe mechanical globe trauma as a standardized international language of ocular traumatology.(29,30) However, it fails to describe non- mechanical globe trauma, which makes up a significant proportion of eye injuries.

The result of the study showed that with the conventional classification system, one third of ocular trauma injuries could not be classified. With the proposed new

classification system, all types of ocular trauma could be classified on the basis of non-mechanical ocular trauma, adnexal injury, and destructive globe injuries.

Kuhn et al proposed the Ocular Trauma Score, published in 2002. (29) The ocular trauma score (OTS) is a scoring system used to predict the visual outcome in patients who have sustained open globe injuries. The scores predictive value may be used to counsel the patients and their families about the possible visual outcome and manage their expectations and anxieties. It provides the clinician with a likely prognostic indication regarding possible visual outcome. This aids the ophthalmologist in deciding management lines especially before embarking on expensive surgical interventions, particularly in low resource settings. The OTS score ranges from 1 (most severe injury and worst prognosis at 6 month follow up) to 5 (least severe injury and least poor prognosis at 6 months). Each score is associated with a range of predicted post-injury visual acuities. It has a predictive accuracy of approximately 80%, Hence the OTS will be accurate 4 out of 5 times. This helps in predicting visual outcome in patients after having sustained open globe injuries.

Ocular Trauma Score (OTS)

Initial visual factor	**Raw points**
A. Initial raw score (based on initial visual acuity)	NPL = 60 PL or HM = 70 1/200 to 19/200 = 80 20/200 to 20/50 = 90 ≥ 20/40 = 100
B. Globe rupture	- 23
C. Endophthalmitis	- 17
D. Perforating injury	- 14
E. Retinal detachment	- 11
F. Relative afferent pupillary defect (RAPD)	- 10

On first examination, an initial raw score based on the initial visual acuity (VA) is assigned. For example, for perception of light (PL) or hand movements (HM) 70 raw points would be assigned.

From this initial raw score, points for each of the factors (starting with the worst prognosis and ending with the least poor prognosis) is subtracted: globe rupture, endophthalmitis, perforating injury (with both an entrance and an exit wound), retinal detachment, and relative afferent pupillary defect (RAPD).(29)

The corresponding OTS score is read off the table for the relevant category after the raw score has been calculated. For each OTS score, the following table gives the estimated probability of each follow-up visual acuity category.

Computational method for deriving the OTS score

Estimated probability of follow-up visual acuity category at 6 months

Raw Score sum	**OTS score**	**NPL**	**PL/HM**	**1/200-9/200**	**20/200-20/50**	**>/- 20/40**
0 – 44	1	73 %	17 %	7 %	2 %	1 %
45- 65	2	28 %	26 %	18 %	13 %	15 %
66 – 80	3	2 %	11 %	15 %	28 %	44 %
81 – 91	4	1 %	2 %	2 %	21 %	74 %
92 – 100	5	0 %	1 %	2 %	5 %	92 %

NPL- nil perception of light, PL- perception of light; HM : hand movements

(33)

A study in Thailand reported that 57% of all work-related eye injuries were open globe eye injuries. Such injuries culminate in a decrease in average best corrected visual acuity of 1.2 ± 1.0 logMAR (20/320). It was observed that 67 % of these patients reported a lack of education of the importance of safety glasses.(34)

A study of open globe injuries in a university based hospital in Isparta,Turkey revealed that of the total 313 patients recruited, 73.2% were men, and the mean age was calculated to be 32.01 years ± 21.04 years. The most common type of injury was penetrating eye injuries. Of 313 injuries, 212 were caused by sharp/projectile objects, and injuries most commonly occurred in the workplace. The factors contributing to a final VA worse than 20/200 was found to be age more than 50 years, injury in zone 2 or 3, blunt injury and rupture type of ocular injury, poor visual acuity at presentation, presence of relative afferent papillary defect, endophthalmitis,

hyphema, retinal detachment, vitreous prolapse, and uveal prolapse based on a univariate analysis. Poor initial VA, retinal detachment, and vitreous prolapse were found to be statistically significant based on multiple logistic regression analysis in this study .(35)

In a retrospective study done by Knyaser, Bolinko et al in southern Israel, most of the open globe injuries occurred at the workplace.(45%). The variables which showed statistical significance (of $p<0.005$) were poor initial visual acuity,blunt trauma injury,trauma in zone 3, low OTS score.(36)

In a study by Zhang et al in central china, work place injuries constituted 15% of total ocular trauma in this retrospective study done in a tertiary centre in Central China from 2006-2011. Most patients were farmers and workers (51.9%)(37)

A significant difference in the final visual acuity between the patients who first arrived in the hospital within 24 hours and those who arrived 24 hours after the injury ($p<0.001$) was documented. In zone 3 open globe injuries, there was a worse visual prognosis than that of zone 1 and zone 2($p< 0.001$). Initial visual acuity correlated with the final visual acuity. Open globe and closed globe injuries had different prognosis in which closed ocular injuries had a better final vision than open globe injuries. Patients with a higher score and grade in the ocular trauma score had better vision.(37)

Another study that included open globe injuries done in China revealed some interesting facts. It was observed that 571 eyes (571 patients) out of a total of 4795 eyes (4693 patients) developed endophthalmitis after sustaining ocular trauma. The rate of incidence was 11.91%. Laceration was found to be an independent risk factor for open globe injury. Surgical intervention (by means of Primary repair) performed within 24 hours, prolapsed of intraocular tissue and self-sealing of wounds imparted a protective shield against the development of endophthalmitis. However, gender, age, breach of lens and posterior extent (zone) of wounds were not found to be significant. Intravitreal administration of antibiotics and corticosteroid therapy was administered to 53 eyes (9.28%), and vitrectomy performed on 305 eyes (53.42%). At discharge or follow-up, the proportion (16.81%) of enucleation/evisceration of eyes with endophthalmitis was higher than that (8.71%) without endophthalmitis.(38)

A retrospective study done by Han et al in Wilmer eye institute between July 1, 2007 and July 1, 2012 of open globe injuries requiring surgical repair was done. The charts of 282 adult patients were analyzed. 193 eyes had at least 6 months of follow-up for analysis. Eighty-six eyes (44.6%) required follow-up surgery within the first year, and 39 eyes (20.2%) were enucleated. Eyes initially treated by a vitreoretinal (VR) surgeon were 2.3 times (P=0.003) more likely to improve by one Ocular Trauma Score (OTS) visual acuity category and 1.9 times (P=0.027) more likely to have at least one more follow-up surgery at 6 months compared to eyes treated by non-vitreoretinal surgeons. Patients with more anterior injuries treated by a VR surgeon were more likely to improve by one OTS visual acuity category

compared to those treated by non-VR surgeons (P=0.004 and 0.016 for Zones I and II, respectively). There was no difference in visual acuity outcomes for eyes with posterior injuries (P=0.515 for Zone III).(39)

Hence it was concluded that eyes initially treated by a VR surgeon are more likely to improve by one OTS visual acuity category than those initially treated by a non-VR surgeon. It was found that patients initially treated by a VR surgeon were more likely to undergo more follow-up surgical rehabilitation. Improvement in visual acuity was more likely for anterior (Zone I and II injuries) than posterior (Zone III) injuries.(39)

The Ocular trauma score (OTS) was designed using the large databases of the United States and the Hugarian Eye Injury Registries and with a grant from the National Centre for Injury prevention at the Centres for disease control and prevention (CDC). (33)

Schimdt et al proposed another model to assist ophthalmologists in treating ocular trauma patients, known as The classification and Regression Tree (CART). The study developed and validated a prognostic model to predict vision survival after open globe injuries. According to the classification tree, the presence of an RAPD and poor initial visual acuity were the most predictive of visual loss. The presence of lid laceration and posterior wound location also predicted poor visual outcome. (40)

Sobaci carried out a retrospective, interventional case series. In 82 patients (88 eyes) with deadly weapon-related open-globe injuries, certain numerical values rendered to the OTS variables (visual acuity, rupture, endophthalmitis, perforating injury, retinal detachment, afferent pupillary defect) at presentation were summated and converted

into OTS categories. The likelihood of the final visual acuities in the OTS categories were calculated and compared with those in the OTS study.(41)

In conclusion, the likelihood of the final visual acuities (no light perception NLP, light perception LP/hand motion HM, 1/200 to 19/200, 20/200 to 20/50, and > or = 20/40) in the OTS categories (1 through 5) in his group were similar to those in the OTS study group. However,visual acuity in the LP/HM in the category-2

(53% vs 26%, P < .001) could not correspond with the OTS group. No eye fell in the category-5 according to the study(the best prognosis).(41)

A prospective study of open globe injuries over a two-year period (July 2009 to June 2011) was done by du Toit N, Mustak N et al. The aim of the study was to determine the visual outcomes in adult patients who sustained open globe injuries and to assess whether it corresponded to the predicted visual outcome according to the the Ocular Trauma Score (OTS) study. Injuries were scored using the OTS and the surgical intervention was recorded. The best corrected visual acuity at three months was regarded as visual outcome.(42) Out of 249 open globe injuries, 169 patients (169 eyes) completed the 3-month follow-up schedule. All patients underwent primary surgery, 175 (70.3%) repairs, 61 (24.5%) eviscerations and 13 (5.2%) other procedures. Globe eviscerations were mainly done on OTS Category 1 cases, but outcomes in this category were not found to be different from OTS outcomes. Outcomes were significantly worse in Category 2. The differences were not statistically significant when the entire distribution was tested.. The association between OTS outcomes and the final visual outcomes in this study was found to be a

strong ($P<0.005$).(42) It was concluded that reliable information regarding the expected outcomes of eye injuries can modify management decisions and patient expectations. The OTS is a valuable tool, which has been validated in many parts of the world.(42)

Importance of protective eye equipment (PEE) - Tens of thousands of people become blind due to work-related eye injuries. These eye injuries could be prevented with the proper selection and use of eye protective devices and safety protective devices like face protection. Eye injuries cost more than $300 million per year in loss of productivity, medical expenditure, and worker compensation.(12)

The National Institute for Occupational Safety and Health (NIOSH) estimates that About 2000 U.S. workers sustain work related eye injuries daily that requires medical attention and management. About one third of these injuries are treated in emergency departments. More than 100 of these injuries result in loss of work for one or more days.

The majority of eye injuries result from small particles or objects striking or scraping the eye. Dust, cement pieces, metal particles, and wood chips are common objects of insult. These materials are often ejected by tools, fall from above a worker or fall due to wind. Large objects may also strike the eye or face. Objects like nails, staples, or slivers of wood or metal pieces can cause penetrating eye injuries and may result in permanent loss of vision. Industrial chemicals or cleaning liquids or solvents are common causes of chemical burns to one or both eyes. Thermal burns to the eye also occur usually among welders. Eye diseases are often transmitted through the mucous

membranes of the eye due to direct exposure to blood, droplets from coughing or sneezing or from touching the eyes with a contaminated finger or object.

Wearing personal protective eyewear, such as goggles, face shields, safety glasses, or full face respirators has been advocated for prevention of eye injuries.

Eye protective devices chosen for specific work environment depends on the nature and extent of the perceived occupational hazard, circumstances of exposure, other protective equipment and safety devices used, and personal vision requirements. Eye protection should appropriately fit an individual or be adjustable to provide sufficient coverage. It should be comfortable to wear and should allow sufficient peripheral vision.

Different types of eyewear and protective devices are available to prevent eye injuries at workplaces.

Safety glasses, including hybrid safety glasses or goggles—minimum protection required. These safety glasses are meant for general working conditions when there is risk of exposure to dust, chips, and flying particles. Safety glasses that have the following- Side protection (such as side shields or wrap-around lenses), treatment to prevent fogging, a retainer to keep the glasses tight to the face or hanging from the neck when not in use. For added protection, hybrid glasses with foam or rubber around the lenses may be worn. Wrap-around hybrid safety glasses that convert to goggles with a soft plastic or rubber face seal for better peripheral vision than conventional goggles is yet another option.

There are guidelines and precautions set by the Occupational Safety and Health Administration when safety glasses need to be worn with prescription lenses.(43)

Use polycarbonate or Trivex® lenses for prescription safety glasses is recommended. These lenses provide the best impact protection in prescription safety glasses. New safety glasses with polycarbonate lenses coating is suggested to reduce scratching. ANSI Z87.1-compliant safety eye protection is advised. Prescription safety lenses with tempered glass or acrylic plastic lenses for protection from high impact is not recommended (unless covered by goggles or a face shield).

If prescription safety glasses is worn without goggles, glasses with side shields is highly advisable.(44)

Goggles are needed to protect workers from high impact, dusty environment, chemical splashes, torch cutting or welding light. Goggles should have the following characteristics with respect to working environment- goggles with indirect venting for splash and fine dust, goggles with direct venting for less fogging. Safety goggles are designed with high air flow for minimum fogging and maximum particle and splash protection (for instance, ski-type goggles). Tight-fitting goggles are suited for dusty environment. In case of contact lens wearers, tight-fitting goggles or a full-face piece respirator are advised to avoid corneal abrasions.(44)

Face shields are an additional protection. Face shields are used to protect workers from high-impact conditions like chipping and grinding. Use full-face protection to prevent contact with chemical or blood-borne hazards that may be sprayed or splashed on the face. It is recommended to use face shields that are tinted or metal-coated for heat and splatter protection. It is essential to wear safety glasses or goggles under a face shield, as the curve of the face shield allows particles or chemicals from the side to enter in the eyes.(44)

Full-facepiece respirator are the best devices for protecting eyes from dust particles, chemicals, and smoke. Full-facepiece respirators are not compatible with casual sunglasses or safety glasses. Hence, it is imperative to wear glasses with approved prescription inserts under a respirator. Likewise half-mask respirator need to worn with compatible and approved protective eyewear.(44)

Welding helmet, goggles, faceshields, and welding respirators are specifically aimed for welders. Exposure to cutting or welding light can cause severe burns and photoretinitis. The lenses for protection from cutting or welding light must be marked with the shade number 1.5 to 14 (the darkest). Welders must use helmet, goggles, faceshield, or welding respirator equipped with lenses of the correct shade number.(44)

The NIOSH has suggested simple safety tips to prevent eye injuries-

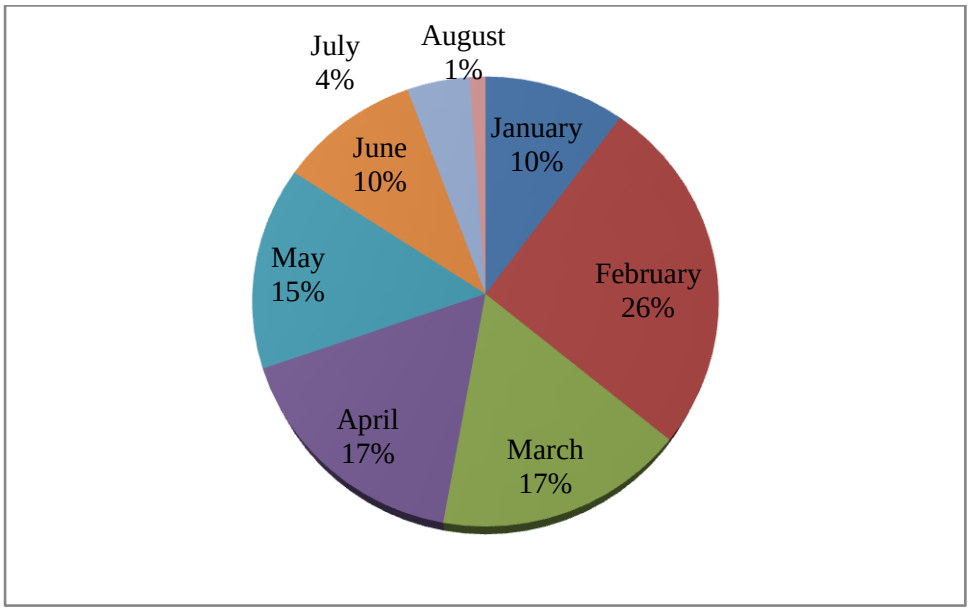
- Brush, shake or vacuum dust and debris from hard hats, hair, forehead or the top of the eye protection before removing the protector.
- Avoid rubbing eyes with dirty hands or clothing.
- Clean eyewear regularly and ensure the eye protective device is in good condition.
- Ensure eye protection fits properly and will stay in place.

RESULTS

A total number of 3469 patients presented to the emergency services of the department from January to August, 2017. Trauma of any type constituted about 12.77% patients of the total persons presenting to the emergency services. Occupational trauma constituted about 2.5% of all persons presenting to the emergency department during the same time period and 19.86% of those presenting with some form of trauma.

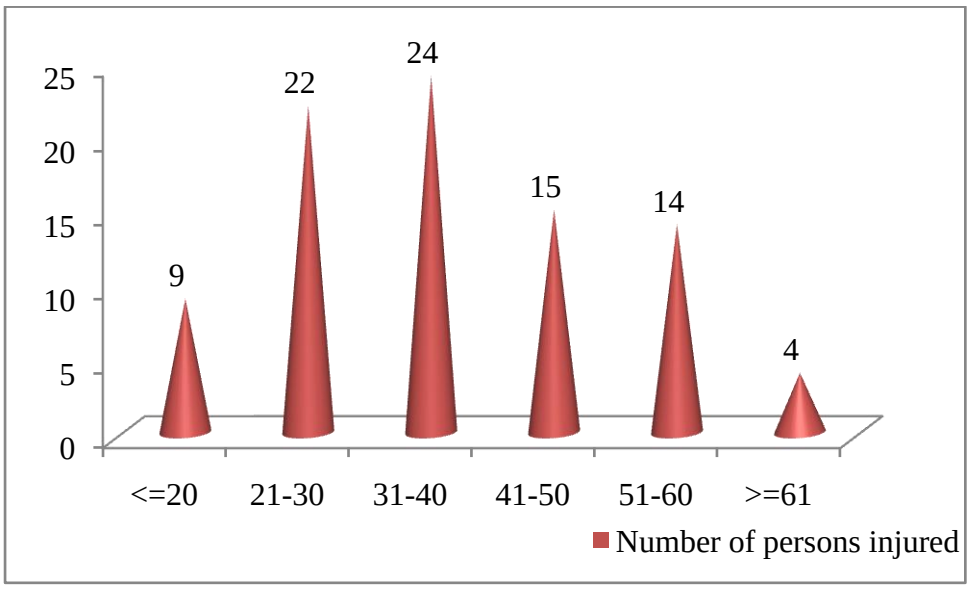
A total of 88 people presented with occupation related trauma to the department from January to August, 2017 who were willing to be part of the study.

Figure 1 – Monthly Distribution of Persons Injured



The maximum number of trauma (74.15%) was recorded in the months of February – May (n = 66).

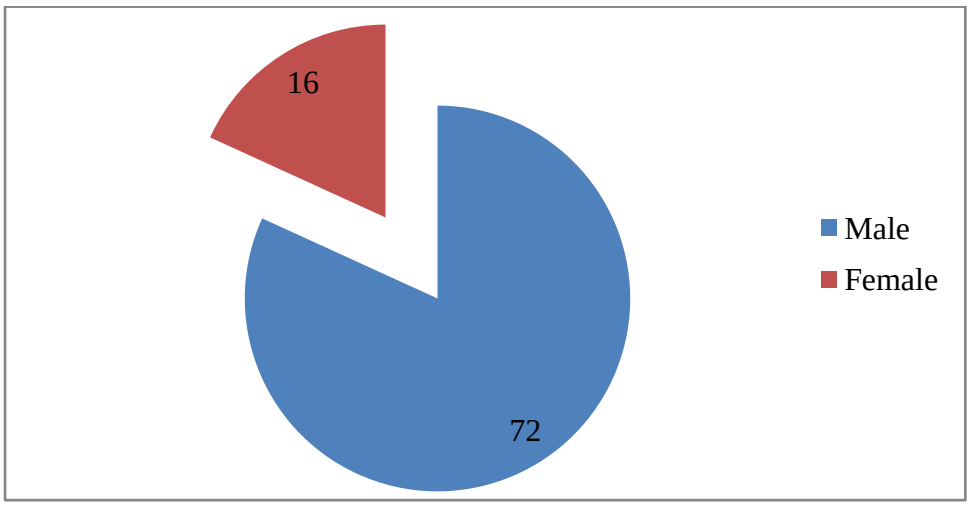
Figure 2 – Age distribution of the persons injured



The age distribution of persons enrolled in the study was from 18 years to 71 years of age. The mean age was 38.27 years (SD 13.50 years).

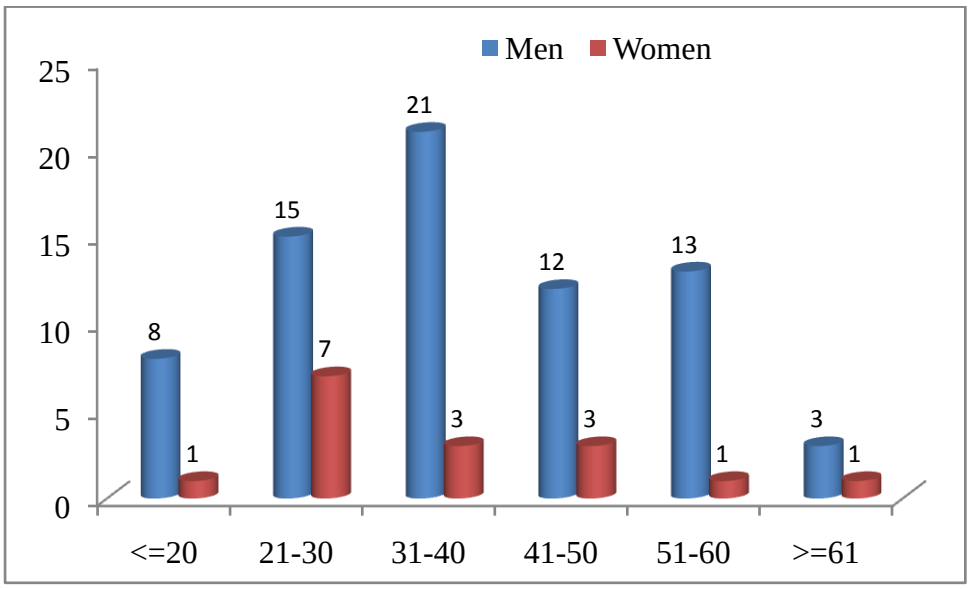
The age group maximum affected was the 31 – 40 age group (28.05%).

Figure 3 – Gender Distribution of Persons Injured



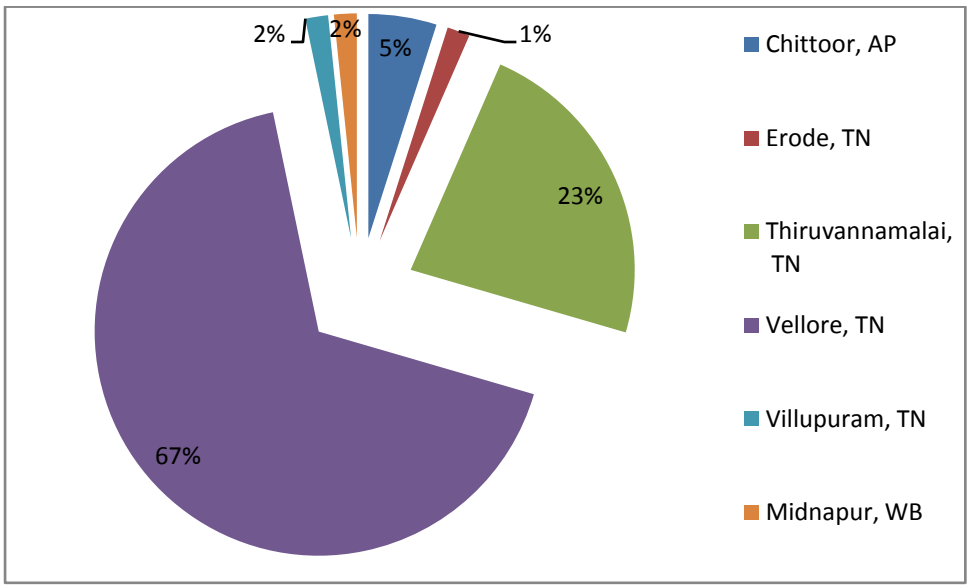
Men (81.8%) were more affected than women (18.2%) with occupation related trauma.(Figure 3)

Figure 4 – Age and Gender Distribution of persons injured



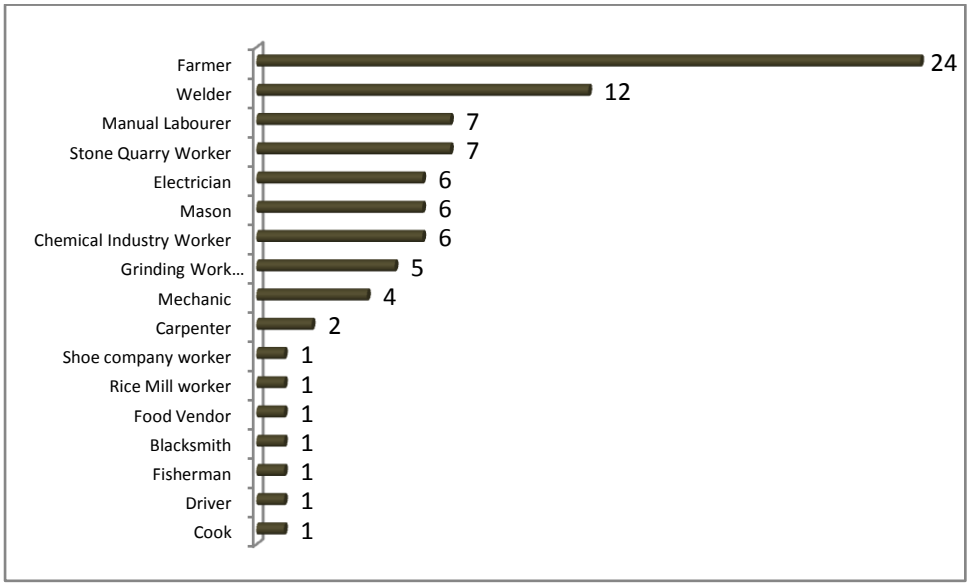
Among the men, those in the age group of 31 – 40 years presented with trauma related to their occupation whereas among women those in the age group 21 – 30 years presented with more trauma.

Figure – 5 Geographic Distribution of Work Places of Persons Injured



The maximum number of persons presented to us from work places in and around the town of Vellore (18.75%). The next common being work places within the Vellore District. Thiruvannamalai and Chittoor District also had patients presenting to us for further management and trauma care as this is the closest tertiary care centre with resident ophthalmologists providing emergency services. These two are the neighbouring districts of Vellore.

Figure 6 Distribution of Occupation of persons presenting with work place related injury



The maximum number of persons presenting with a work place injury was among farmers (27%). Welders formed the next highest group (13%).

The occupations of the persons presenting with trauma that most were agriculture based or unskilled work.

The metal foreign body was the commonest cause (39%) of injury in the industrial sector. This was followed by welders and those grinding either metal or stone.

(Figure 7)

In the non-industrial sector, injury with vegetative matter was the commonest cause of injury (27.5%). This was followed by particulate matter at the work place which could be preventable. (Figure 8)

Figure 7 Cause of injury in the industrial sector

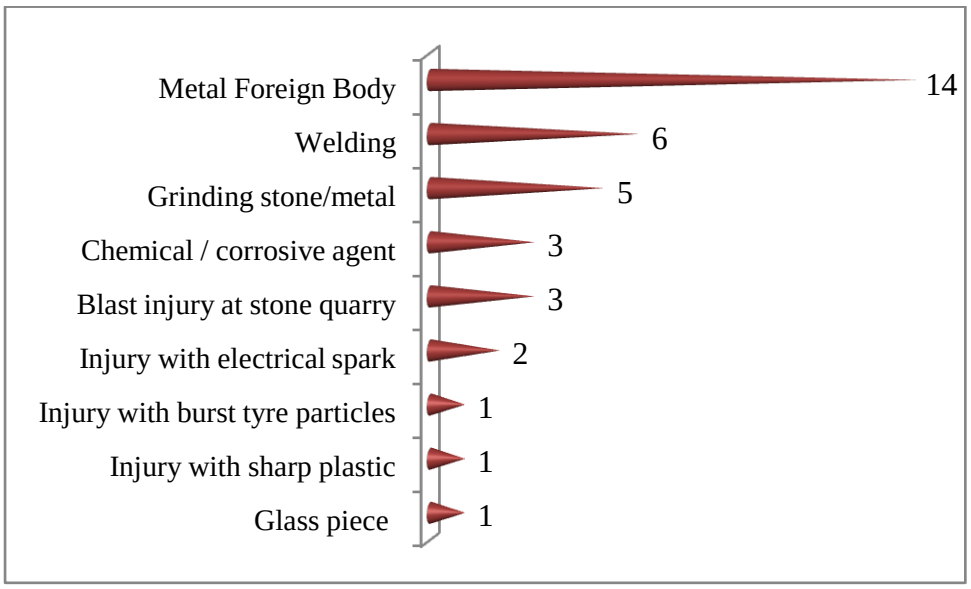


Figure 8 Cause of injury in the non-industrial sector

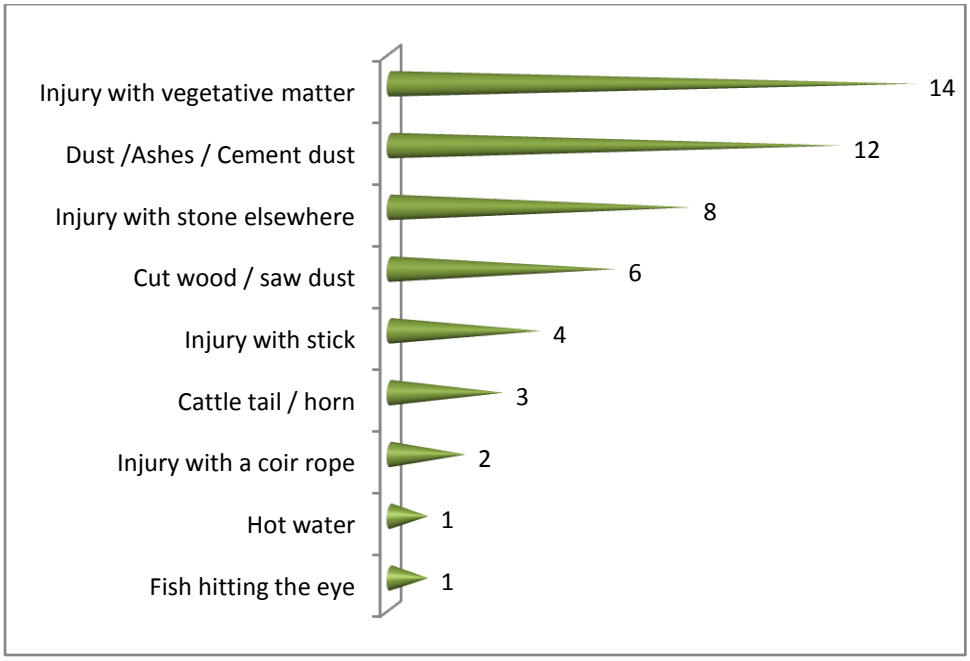
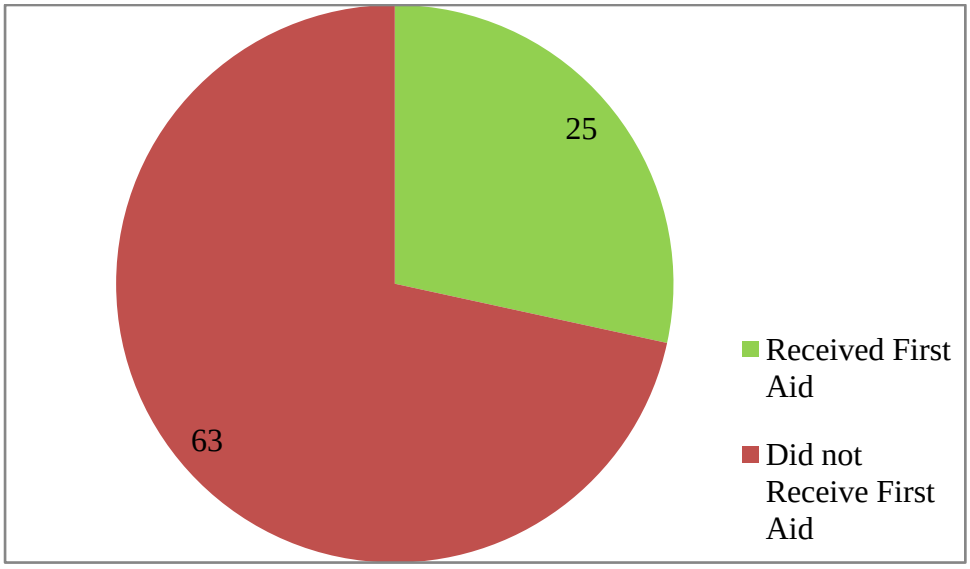


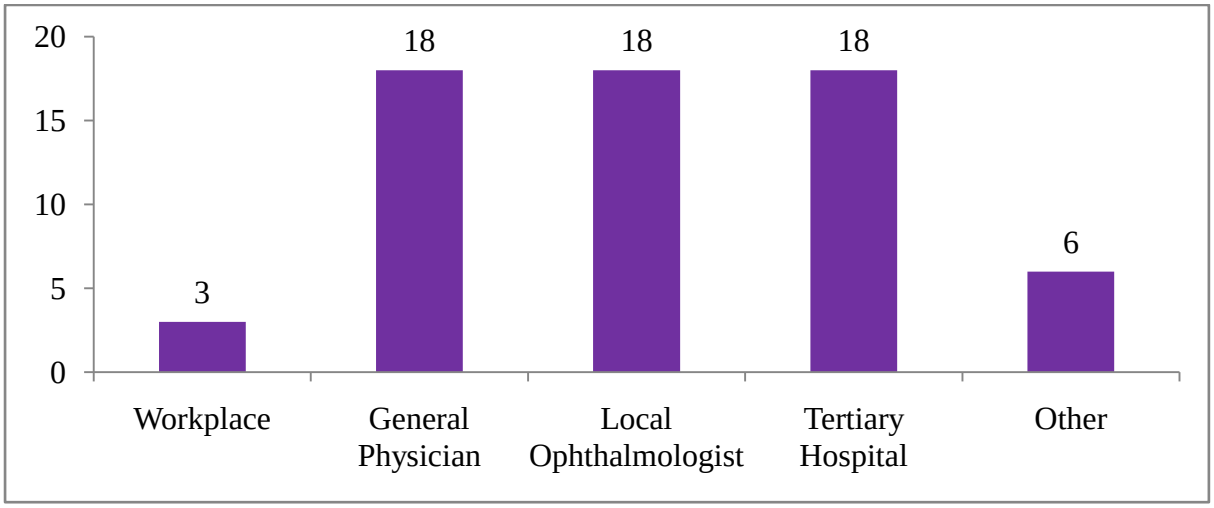
Figure 9 Persons received first aid after injury at their work place



The number of people receiving first aid following the injury was only 72%

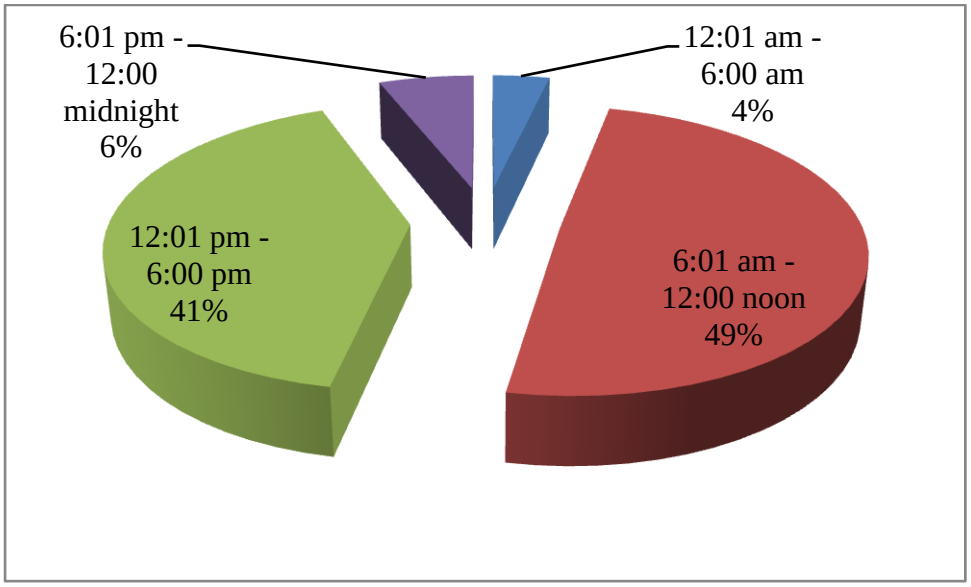
(Figure 9).

Figure 10 Place of receiving first aid following the injury



The places where they had received the first aid ranged from their workplace to the Ophthalmologist prior to presenting to the department emergency section for further expert management. Thirty percent of the patients came directly to our emergency service to receive even first aid (Figure 10).

Figure 11 Time of injury



The maximum number of injuries (90%) occurred between 6 am to 6 pm (Figure 11).

Among those injured, 21.4% of the patients had previously sustained an injury at least once in the work place. One person had had injury to the eye on more than 4 occasions (Figure 12).

Figure 12 Number of times injured in the eye in the past at the workplace

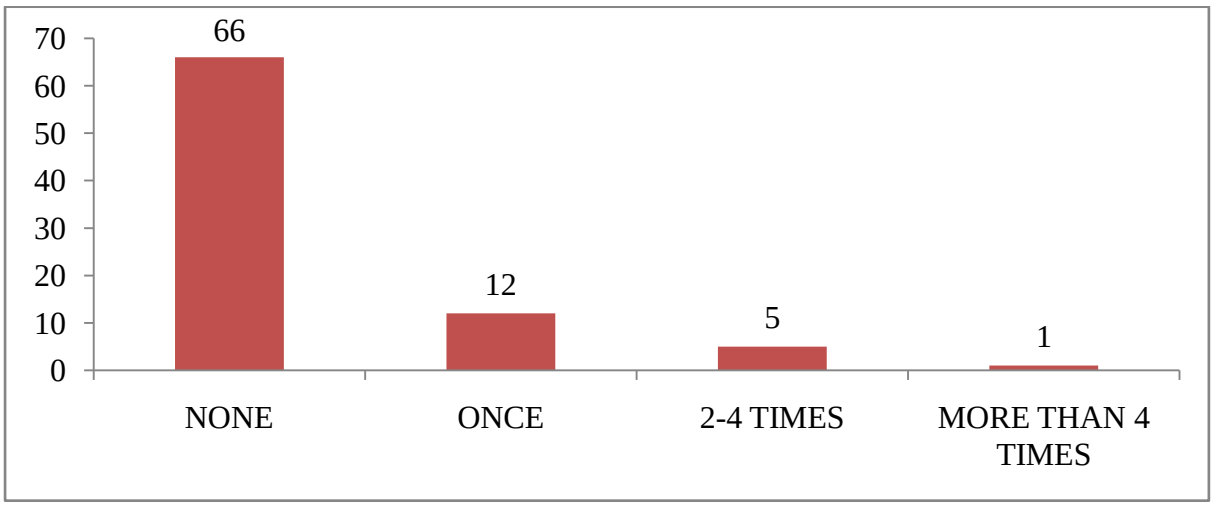
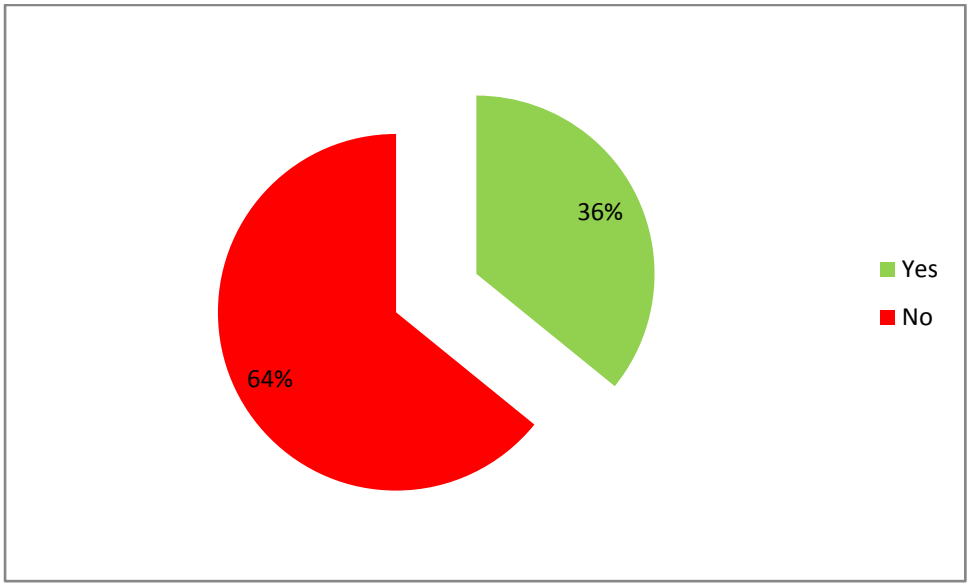
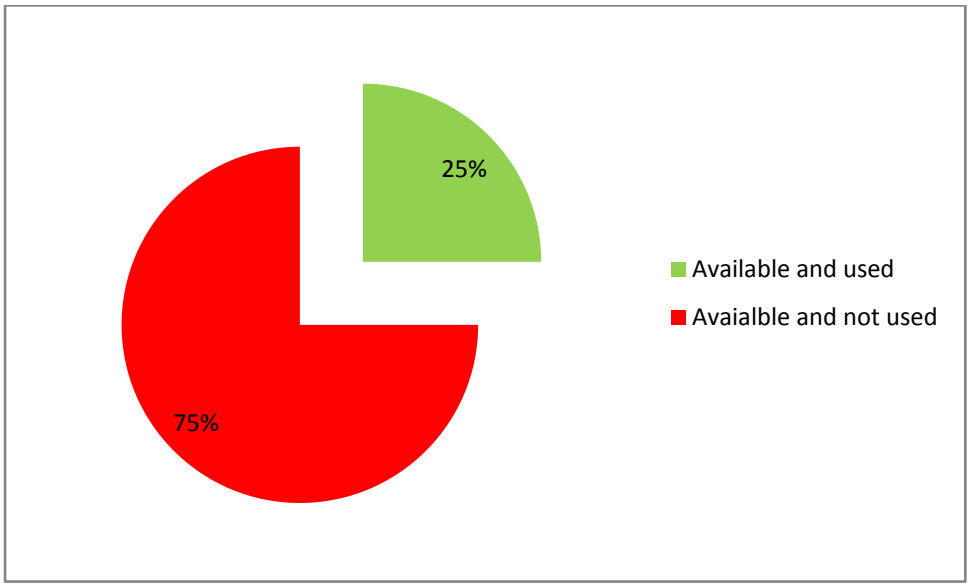


Figure 13 Awareness of Eye Protective Devices to be used in the work place



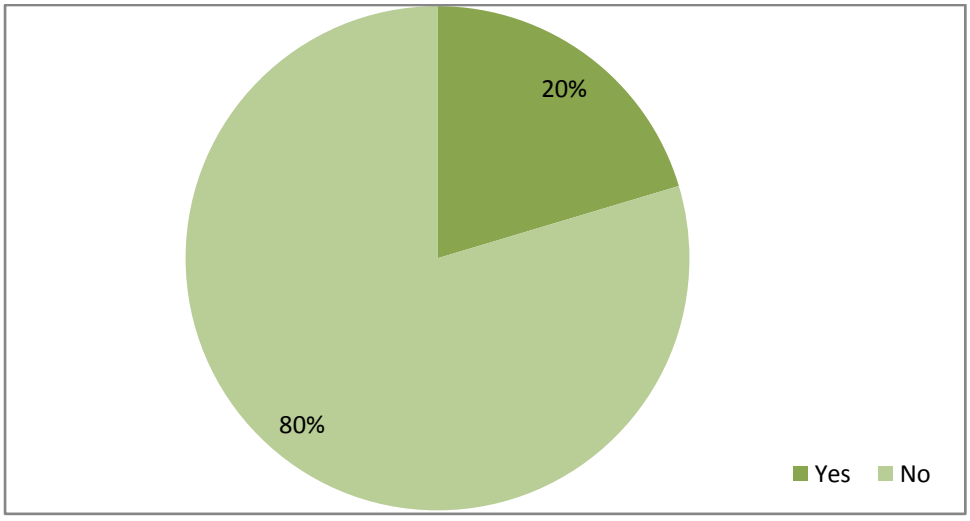
Only 36% of the patients were aware of the eye protective devices when asked when they presented with their work place related injury (Figure 13).

Figure 14 Use of eye protective devices at the time of injury



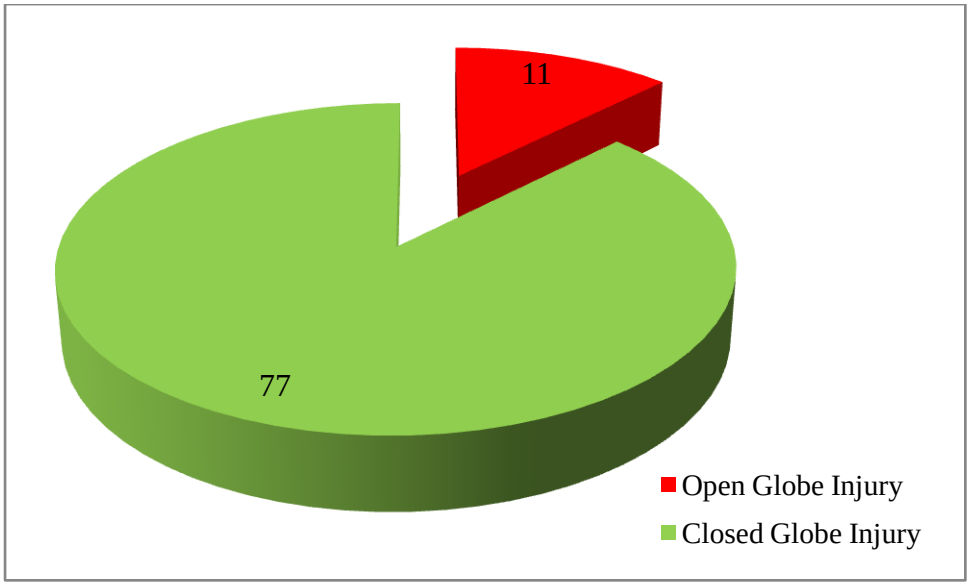
Among those who were aware of the availability of eye protective devices only 25% used them and still got injured. The rest 75% were not using the eye protective device while at work (Figure 14).

Figure 15 Use of any safety device while at the work place



Eighty percent of the patients who were working in the industrial sector claimed that they did not use any safety device while at work at their work place (Figure 15).

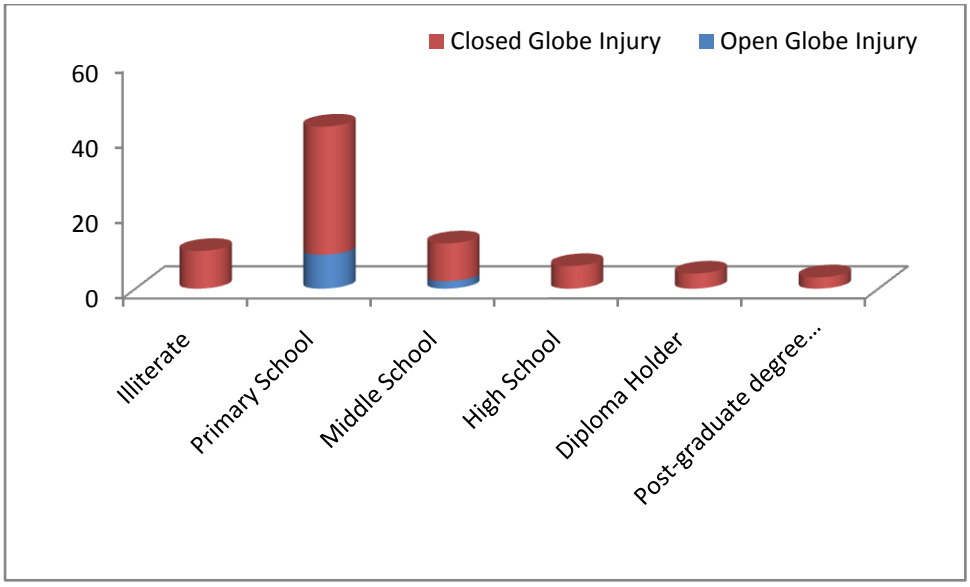
Figure 16 Type of ocular injury following a work place trauma



Among the 88 who presented with injury to the emergency services, 12.5% had an open globe injury (Figure 16).

All patients with open globe injury and 96% of the patients with closed globe injury were from the lower socioeconomic group (according to Modified Kuppusamy Scale).

Figure 17 Distribution of type of injury based on literacy status



Open globe injury was more common in those with primary school education. Most of the injured (74%) – both open and closed globe injury – occurred in those whose education status was middle school or below (Figure 17).

Table 1 Demographic profile of patients and their presenting visual acuity

		6/6 - 6/12	6/18-6/36	6/60 or worse	P-Value
Age (in years)	18-30	17	2	8	0.217
	31/50	18	10	8	
	>50	7	6	5	
Gender	Male	33	16	19	0.305
	Female	11	3	2	
High Risk Occupation	No	19	11	10	0.562
	Yes	25	8	11	
Income (monthly, in Rs)	<=2091	2	6	5	0.023
	2092-6213	20	4	5	
	6214-10356	9	5	8	
	>=10357	9	3	1	
Education of Patient	Illiterate	6	2	2	0.067

	Primary School	18	11	12	
	Middle School	3	4	4	
	Higher than Middle School	11	0	1	
Use of Safety Device	Yes	9	0	2	0.082
	No	19	9	13	
Socioeconomic Status	Lower	41	19	21	
	Lower middle	3	0	0	0.243

Visual acuity at presentation in 47.7% of patients across all ages was better than 6/12 and worse than 6/60 in 23.9%. Nineteen men and 2 women had vision worse than 6/60 following either open or closed globe injury. Those with a lower income bracket were at higher risk for injuring their eye and presenting with worse vision ($p < 0.05$). Those with lower education also were at higher risk for presenting with worse vision ($p < 0.067$). Those who were not using a safety had a varied presentation in their vision. Those who used the safety device had a better visual acuity. Socioeconomic status did not affect the presenting visual acuity.

The profile of ocular injuries related to work place related trauma is listed in Table 2. It ranges from minor injuries like conjunctival inflammation, allergic reactions, abrasions on the cornea and conjunctiva and anterior chamber inflammation that requires short term medical treatment. Non-vision threatening injuries like the lid tears and orbital fracture require appropriate surgical intervention to maintain ocular integrity, structure and cosmesis. Vision threatening injuries like isolated corneal, scleral and corneoscleral tears if not managed properly can result in loss of days at work, incur losses at the therapy and result in visual impairment of various degrees.

Table 2 Profile of ocular injuries seen in work place injuries

Orbit and adnexa	Orbital fracture – 1	
Lid	Full thickness upper lid tears – 4 Full thickness lower lid tears – 2 Lower lid tear along with canalicular injury – 1	Marginal lid tear – 2 Lid oedema – 13
Sclera	Scleral tears – 3	
Conjunctiva	Conjunctival tear – 5 Subconjunctival haemorrhage – 9 Foreign body – 5	Epithelial defect – 3 Conjunctivitis – 9 Limbal ischaemia – 1
Cornea	Foreign body – 24 Abrasions – 6 Epithelial defect – 21 Corneal ulcer – 6 Infiltrate – 5	Superficial punctate keratopathy – 15 Full thickness corneal tear – 5 Partial thickness corneal tear – 3 Limbal corneal tear – 2
Anterior chamber	Hyphaema – 5 Uveitis – 22	Hypopyon – 3 Exudative membrane – 2
Uveal tissue	Iris foreign body – 1	Uveal tissue prolapse – 2
Lens	Anterior capsule rupture – 4	
Vitreous	Vitreous prolapse to the wound – 3	Vitreous haemorrhage – 2
Retina	Commotion retinae – 2	Retinal tear – 1

Table 3 Profile of patients with open globe injuries with retained intraocular foreign body

	Case 1	Case 2	Case 3	Case 4
Age/ Gender	32 / M	30 / F	26 / M	30 / M
Occupation	Mason	Stone quarry worker	Grinding worker	Truck driver in the stone quarry
Mode of injury	Hammering a nail into wood and the nail chip flew	Hammering stone	Grinding stone with a machine	Blast injury at work place
Time of injury	10:30 AM	12 PM	7:30 AM	9 AM
TYPE	C	C	C	C
GRADE	4	2	4	3
PUPIL	NEGATIVE	NEGATIVE	POSITIVE	NEGATIVE
ZONE	1	2	3	3
Vision at presentation	2/60	6/9	Perception of light, accurate projection	6/36
Vision at 1 month follow up	6/36	6/9	Perception of light, accurate projection	6/6

Our study had 4 patients who had retained intraocular foreign bodies and required surgical intervention (Table 3).

The open globe injuries require surgical intervention as a primary measure to maintain integrity of the globe and may require other surgeries at later stages to improve their visual outcome. They are also at risk for infections like endophthalmitis and loss of vision. The causes for low vision at the end of 1 month were inferior retinal detachment, vitreous haemorrhage, corneal scarring and aphakia (Table 4).

Table 4 Profile of patients with open globe injuries with no retained intraocular foreign body

Age/Gender	25 / F	28 / M	20 / M	31 / M	71 / M	71/ M	25 / M	27 / M
Occupation	Farmer	Electrician	Stone quarry worker	Stone quarry worker	Farmer	Farmer	Mechanic	Farmer
Mode of injury	Cutting branches of the tress	Cutting metal wire	Injury with stone	Injury with stone	Injury with cow horn	Injury with cow horn	Chipping metal	Injury with stone
Time of injury	5PM	5:45 PM	6:30 PM	8:30 AM	4 PM	4 PM	12 PM	2 PM
TYPE	A	B	B	A	B	B	B	B
GRADE	4	2	4	4	4	4	4	1
PUPIL	Negative	Negative	Negative	Positive	Positive	Positive	Negative	Negative
ZONE	1	2	1	3	2	2	1	2
Vision at presentation	Hand movements	6/18	Hand movements	Hand movements	Perception of light, accurate projection	Perception of light, accurate projection	1/60	6/36
Vision at 1 month follow up	6/24	6/9	6/12	Perception of light, accurate projection	Counting fingers at ½ metre	Counting fingers at ½ metre	6/12	6/18

DISCUSSION

Ocular injury is a one of the leading causes of monocular visual impairment and a major public health concern. It is estimated that 55 million eye injuries occur worldwide every year, causing blindness in 1.6 million patients. Wong et al, 200(45) in their report estimated that the cumulative life time prevalence of ocular trauma was nearly 20% i.e. 1 in 5 persons suffer and eye injury anytime in their lifetime. Desai et al, 1996 estimated the 1 year cumulative incidence of ocular trauma needing hospital admission is to be 8.14 per 100 000 population(4).

In India it is estimated that 1 in 125 individuals lose their sight due to an eye injury(46). The magnitude of the problem in a country like India with a large population of unskilled and unregulated industry lives in the rural and urban slum areas. Prevalence rates of ocular trauma reported from the urban area is 3.97% (47), rural area is 7.5% (48) and urban slum is 2.4% (49).

Workplace is the place where a person spends a significant part of their day and sometimes even their night. With the high demand for large outputs at a shorter time, industries work through the day and night and this requires people to either man machines or be working in shift duties. Therefore, the work place becomes the most common place for ocular injuries. Multiple studies have reported that around 50% of ocular injuries occur at work place (50–52,48,46,53–56). These injuries are common in all sectors such as industries-organized or unorganized, hospitals, agriculture etc. The situation is similar in developed and developing countries.

Certain occupations have been identified as high risk groups, they include welders (57), agricultural workers (58,59), carpenters (60), stone quarry workers, surgeons and dentists (61,62). Activities such as hammering, grinding, welding, sanding, soldering and smelting are high risk in causing ocular injuries. The incidence of intraocular foreign bodies have also been reported to be higher in the work related injuries (63). The other activities that pose a high risk for ocular injuries include handling of chemicals, arc welding and exposure to UV rays, radiations and lasers.The eye injuries could be minor leaving a minimal impact on the person's life but also could be major enough to leave them with a grievous injury and loss of vision. Minor injuries are also known to cause serious consequences if not given timely first aid and appropriate management (64).

Studies have also shown that more than 90% of work-related eye injuries are preventable (65) by the adoption of safety measures and the use of personal protective equipment (66–68).While majority of work-related injuries are preventable, absent, inadequate or inappropriate (69) use of personal protective equipment (PPE) remains an important risk factor.

Several studies have reported low compliance of PPE (70,71,69,72). The compliance is low in places where PPE is available even when the benefits of PPE are known. People may choose not to wear the PPE even when they are aware of their vulnerability and dangers of such actions (73). Some studies have reported that very few people use the PPE always (73).

However, majority of these studies are done in developed countries where PPE are readily available.

Visual impairment following occupation related trauma has been shown to decrease the quality of life and lead to emotional and economic disturbances in the social context. Use of protective devices has been shown to decrease the incidence of occupation related trauma but multiple studies have shown a poor use and a lack of awareness of protective eye wear.

Trauma constituted 12.77% of patients presenting to the emergency services in the department during the time period of January to August, 2017. Among these 2.5 % were occupation-related.In the United States, according to the Bureau of Labour Statistics, the incidence rate for non-fatal occupational eye injuries is 2.3%(per 10,000 fulltime workers) among total private, state and local government employees in the year 2015.

A retrospective study of 165 patients presenting with ocular trauma in a tertiary level hospital in Kumaon region of Uttarakhand state in India attributed 33 (20%) cases to be occupation related hazards (M:F – 10:1)(8). Occupation related ocular trauma formed the most number of eye injuries second only to road traffic accidents. Industrial workers were more frequently affected in a study done in done by Dhasmana in Uttarakhand.(9) Work related trauma constituted 22.4 % in a study done in Vellore by Rose et al. (28)

A monthly distribution of occupation related trauma cases showed that the month February recorded the maximum number of trauma. The months of February to May had the most number of casualty footfalls. A study done in the same institution showed that the number of ocular trauma cases showed a significant peak during festivals. The most number of ocular trauma cases recorded were in the months of January & November with January coinciding with Pongal and November coinciding with Diwali. Higher incidence of trauma was recorded closer to the dates of these festivals. (28)

The age distribution showed that people in the productive and active years of their lives were most affected. The maximum number of eye trauma was seen in the age group of 31-40 years. The oldest person in the study was 71 years. The minimum cut off age was set at 18 years. Hence the minimum age was also 18 years. In the United States, according to the Bureau of Labour Statistics, the incidence rate for non-fatal occupational eye injuries is highest among the 20-24 age group with 3.0% , followed by the 25-34 age group with 2.7 % (per 10,000 fulltime workers) among total private, state and local government employees in the year 2015.

The mean age of the patients was 28.1 ± 6.5 (range: 15-54) when a study of work-related eye injuries was done in Turkey. The biggest percentage was found to be in between 25 and 34 years of age. (21)A study by Titiyal et al showed that most number of ocular injuries in India occurred in the age group of 25-34 years (n=39, 23.6%) followed by 15-24 years (n = 36,21.8 %). (8) A study by Dhasmana et al showed that people in the age group of 21-40 years were affected the most.(9)

The study by Rose et al showed that age the age group of 21 to 30 was most affected closely followed by 31-40 years.(28)

Men were 4 times more affected by eye trauma than women. This is congruent with the results on the pattern of ocular trauma in most studies. The Bureau of labour statistics, U.S. estimates that the incidence rate for non-fatal occupational eye injuries is highest among men (3.2%), followed by women (1.1 %) (per 10,000 fulltime workers) among total private, state and local government employees in the year 2015.

A vast majority of the patients were males (95.3%, n = 778) according to the study done in Turkey by Serinken et al. (21) The study by Dhasmana et al showed that among occupation related ocular trauma cases, 20 men and 5 women were affected. (9) Titiyal et al reported similar results with 30 men and 3 men affected by eye injuries at their workplaces. (8)

In our study, men in the age group of 31- 40 years were most frequently afflicted by occupation related eye trauma. Interestingly, women in the age group of 21-30 years were most affected with regard to eye injuries at workplace. Dhasmanas results showed that men outnumbered women in all categories of trauma (including occupation related ocular injuries). The only exception was during household work, where women predominated over men (M=0, F=13).(9)

A significant proportion of patients who presented to the Ophthalmology casualty were from Vellore district followed by patients from Thiruvannamalai district. CMC is a tertiary care referral centre in Vellore. The Vellore Medical College government hospital also receives a number of casualty patients. We also had few patients from nearby districts like Villipuram and Erode. We also had patients from other states namely Andhra Pradesh and West Bengal.

We had the most number of patients from the agricultural sector followed by the Industrial sector. India is predominantly an agrarian economy although one of the most rapidly developing economies in the World. This explains why most of the patients are farmers followed by industrial workers (mostly welders and stone quarry workers). The patients constituted mostly unskilled and semiskilled workers, who form the lower socioeconomic class. Our study showed that metal foreign body was the most common object of insult followed by injury with vegetative matter. This was similar to the findings of Serinkens study of work-place related eye injuries in Turkey.(21)Most patients were working in the metal and machinery sectors (66.4%, *n* = 542). (21) Sugarcane leaf injury constituted a significant part of vegetative matter. The study by Rose et al showed that the most common object of insult was stick (22.2%) and vegetative matter(10.4%). This was followed by road traffic accidents (9.4%) and injury with metal (8.2%). (28)

Insult with metallic foreign body constituted the premier object of insult causing eye trauma among the industrial sector. Injuries caused during welding and grinding comprised the other modes of insult in the same order. A study in Dehradun, Uttarakhand by Dhasmana et al showed that most number of ocular injuries occurred in industrial workers (23.86%)after road traffic accidents (37%).This was followed by eye injuries among the agricultural sector (15.9%), constituted mainly by labourers and farmers. (9) The current study recorded maximum injury with vegetative matter.

The current study showed that only 25 patients out of 88 patients received first-aid at their work place. Most patients preferred to seek treatment from a doctor or go to a hospital. The study showed an equal number of patients seeking treatment from a doctor / eye specialist/ tertiary hospital.

Our study showed that the maximum number of eye injuries at workplace occurred between 6:00 hours and 18:00 hours. A study in west Turkey showed that the maximum number of work related eye injuries i.e 77.5%, (n = 632)occurred between 0900 hrs and 1700 hrs with a peak between 1300 hrs and 1400 hrs .The Turkey study attributed carelessness and hurrying up as the commonest cause among worker-related causes of workplace related eye injuries, while lack of protective eye equipment ranked the most among workplace-related causes of eye trauma.(21)

The current study showed that 21.4 % of patients had sustained work-related eye injury at least once in the past. Serinkens study of workplace reated eye injuries in Turkey showed that about half of the workers had less than one year experience. (21)It follows that young male workers with less work experience (less than a year) had greater risk of work-place related injuries. (21) A study by Adams et al among stone quarry workers in Tamil Nadu showed that protective eyewear and enhanced education reduced the incidence of work-related eye injuries at three months by 16% (95% CI 7–24%); and standard education by 13% (95% CI 4–22%), compared to the three months before interventions. The overall reduction over baseline in eye injuries at six months was greater with enhanced education (12% decrease; 95% CI 3–21%) than with standard education (7% decrease; 95% CI 17% decrease to 3% increase). Educational sessions and motivational talk with the working community promotes the use of protective eye equipment and awareness about eye safety. Provision of appropriate eye protective devices reduces the incidence of eye injuries in stone-quarry workers.(27)

The present study showed that only 36% of patients who has sustained work-related eye injuries were aware of eye protective devices. Twenty five percent of patients reportedly used protective eyewear at the time of injury and yet got injured. They maintained that eye protective gear was available at their workplace. However 75% of workers did not use protective eye wear at their workplaces. A study by Alexander et al in Vellore among welders recorded poor use of PPE. None of the welders used personal protective eyewear, or appropriate clothing. They worked

mostly bare-handed. The welders in the study reportedly could not afford protective eyewear and those were not provided by their respective employers.(24)

The lack of eye protective measures (goggles etc.) ranked the highest among workplace-related causes of eye injuries as per Serinkens study among industrial workers in Turkey. (18.7%, $n = 207$) .According to his results, 172 patients had pointed out that protective equipment (such as goggles and gloves etc.) were available in the workplace, although they were not being used at the time of injury (21.1%).(21) Another study in Bangalore, Karnataka showed that among factory workers, only 51%were wearing protective glasses, while 27% were not wearingthough, they were provided with and 22% were not aware of protective glasses.(74)

The use of safety devices was markedly low among workers. Eighty percent of patients did not use any safety devices at their workplaces. Probably it was not provided by their employers as has been noted by Alexander et al in their study among welders.(24)

A majority of patients who presented to US had sustained closed globe injuries at their workplaces between the months of January and August. Out of the total 88 patients recruited, 77 patients had closed globe injuries. Closed globe injuries constituted 54.7% of work-place related eye injuries in the study by Shashikala et al in Bangalore, Karnataka, India.Of 306 cases, 155 (50.6%) were work place-related in her study.

The study was done in hospital which caters exclusively to factory employees (manufacturing units like garments, grinding, and so on) and their families. Hence the study showed a higher incidence of work-place related eye injuries. (74) Jovanovic et al study in Belgrade showed that 39% of ocular trauma was work-place related.(75) Thompson et al reported that 31% (87/283) of all eye trauma patients were occupation related based on a study in the accident and emergency department of a district general hospital in U.K.(76)Work place injury ranged from 31% to 39% as per these studies. Open globe injuries constituted 19.3% of all injuries which had presented to eye casualty according to the epidemiology study by Rose et al in Vellore.(28)

According to our study, almost all patients who had occupation related ocular trauma belonged to the lower socioeconomic status (open globe injury-100%, closed globe injury-96%). A study in north Delhi among welders showed that approximately one-third of them (n = 33; 31%) were educated up to primary level, whereas 27% (n = 29) were illiterate.(77) In our study, most workers who had open globe injuries had schooling up to primary school level. The findings are similar to our study which shows that most of the workers whose education was middle school or lesser. Most semi-skilled and unskilled workers are of the lower socio-economic background.

It has been noted from this study that most workers who were inflicted with work related eye injuries come under the lower income category. This is congruent with Chauhan et al study in rural Delhi. The socioeconomic profile of the welders in his study showed that most welders come from lower income groups. About 27% of

welders were illiterate and 31% were educated upto primary school level. These welders were 15-39 year old males who were mostly educated upto primary school or illiterate and from lower income. 75 % were in resettlement homes and 20% lived in slums.(77)Alexander et al showed that among the welders, low educational background was associated with an increased risk of eye injury ($P < 0.05$, OR = 0.29).(24).

CONCLUSIONS

Occupation related trauma is a preventable cause of ocular injury

Adequate awareness and use of safety devices could prevent grievous ocular injury

Occupation related injury to the eye occurs maximum in the age group of 30 – 40 years. Any grievous injury could affect the individuals future job prospects and tip the economic balance of their family

Many of the open globe injuries occurred in the stone quarries, domestic animal owners and unorganized sectors like electricians

The agricultural work related workers presented with the largest number of injuries at work

Developing a program to improve equipment for protection and implement their use among agricultural workers will decrease the impact of grievous injuries in the farmers

Implementing stricter national laws for the use of protective devices will probably decrease the occupation related injuries in the organized sector initially Targeting occupations at risk, enhancing education and training, providing effective eyeprotection gear , and developing workplace safety may reduce occupational eye injuries.

Improving awareness of occupation related injuries and the need to prevent it should be in the public health agenda

LIMITATIONS

The study does not reflect the entire spectrum of ocular trauma. It is not indicative of the total number of occupational eye trauma cases who presented to casualty. The number of open globe injuries that got admitted may have been more than what has been captured.

Patients below the age of 18 years were not recruited for the study even though many presented with occupation related trauma especially from the unorganized sectors.

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OFFICE OF RESEARCH
INSTITUTIONAL REVIEW BOARD (IRB)
CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA

Dr. B.J. Prashantham, M.A., M.A., Dr. Min (Clinical)
Director, Christian Counseling Center,
Chairperson, Ethics Committee.

Dr. Anna Benjamin Pulimood, M.B.B.S., MD., Ph.D.,
Chairperson, Research Committee & Principal

Dr. Biju George, M.B.B.S., MD., DM.,
Deputy Chairperson,
Secretary, Ethics Committee, IRB
Additional Vice-Principal (Research)

January 20, 2016

Dr. Jophy Philips Cherry,
PG Registrar,
Department of Ophthalmology,
Christian Medical College,
Vellore - 632 004.

Sub: **Fluid Research Grant NEW PROPOSAL:**

Profile of occupation related ocular trauma- An observational study in a tertiary care referral institution.

Dr. Jophy Philips Cherry, Employment Number: 52963, Dr. Smitha Jasper, Associate Professor, Dr. Anika Amritanand, Emp. No – 32301, Assistant Professor, Department of Ophthalmology. Mahasampath Gowri. S, Emp. No: 33418, Department of Biostatistics

Ref: IRB Min No: 10430 [OBSERVE] dated 05.12.2016

Dear Dr. Jophy Philips Cherry,

I enclose the following documents:-

1. Institutional Review Board approval 2. Agreement

Could you please sign the agreement and send it to Dr. Biju George, Addl. Vice Principal (Research), so that the grant money can be released.

With best wishes,

Dr. Biju George
Secretary (Ethics Committee)
Institutional Review Board

Dr. BIJU GEORGE
MBBS., MD., DM.
SECRETARY - (ETHICS COMMITTEE)
Institutional Review Board,
Christian Medical College, Vellore - 632 002.

Cc: Dr. Smitha Jasper, Dept. of Ophthalmology, CMC, Vellore

Ethics Committee Blue, Office of Research, 1st Floor, Carman Block, Christian Medical College, Vellore, Tamil Nadu 632 002
Tel: 0416 – 2284294. 2284202 Fax: 0416 – 2262788, 2284481 E-mail: research@cmcvellore.ac.in

Dr. B.J. Prashantham, M.A., M.A., Dr. Min (Clinical)
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Dr. Anna Benjamin Pulimood, M.B.B.S., MD., Ph.D.,
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Sub: **Fluid Research Grant NEW PROPOSAL:**
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Dr. Jophy Philips Cherry, Employment Number: 52963, Dr. Smitha Jasper, Associate Professor, Dr. Anika Amritanand, Emp. No – 32301, Assistant Professor, Department of Ophthalmology. Mahasampath Gowri. S, Emp. No: 33418, Department of Biostatistics

Ref: IRB Min No: 10430 [OBSERVE] dated 05.12.2016

Dear Dr. Jophy Philips Cherry,

The Institutional Review Board (Blue, Research and Ethics Committee) of the Christian Medical College, Vellore, reviewed and discussed your project titled "Profile of occupation related ocular trauma- An observational study in a tertiary care referral institution" on December 05th 2016.

The Committee reviewed the following documents:

1. IRB Application format
2. Patient Information Sheet and Consent Form (English, Tamil)
3. Cvs of Drs.Anika, Smitha J and Ms. Gowri.
4. Questionnaire
5. No. of documents 1- 4

The following Institutional Review Board (Blue, Research & Ethics Committee) members were present at the meeting held on December 05th 2016 in the BRTC Conference Room, Christian Medical College, Bagayam, Vellore 632002.

Ethics Committee Blue, Office of Research, 1st Floor, Carman Block, Christian Medical College, Vellore, Tamil Nadu 632 002
Tel: 0416 – 2284294, 2284202 Fax: 0416 – 2262788, 2284481 E-mail: research@cmcvellore.ac.in

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Director, Christian Counseling Center,
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Dr. Anna Benjamin Pulimood, M.B.B.S., MD., Ph.D.,
Chairperson, Research Committee & Principal

Dr. Biju George, M.B.B.S., MD., DM.,
Deputy Chairperson,
Secretary, Ethics Committee, IRB
Additional Vice-Principal (Research)

Name	Qualification	Designation	Affiliation
Dr. Biju George	MBBS, MD, DM	Professor, Haematology, Research), Additional Vice Principal , Deputy Chairperson (Research Committee), Member Secretary (Ethics Committee), IRB, CMC,Vellore	Internal, Clinician
Dr. B. J. Prashantham	MA(Counseling Psychology), MA (Theology), Dr. Min (Clinical Counselling)	Chairperson, Ethics Committee, IRB. Director, Christian Counseling Centre, Vellore	External, Social Scientist
Dr. Ratna Prabha	MBBS, MD (Pharma)	Associate Professor, Clinical Pharmacology, CMC, Vellore	Internal, Pharmacologist
Dr. Rekha Pai	BSc, MSc, PhD	Associate Professor, Pathology, CMC, Vellore	Internal,Basic Medical Scientist
Rev. Joseph Devaraj	BSc, BD	Chaplaincy Department, CMC, Vellore	Internal, Social Scientist
Mr. C. Sampath	BSc, BL	Advocate, Vellore	External, Legal Expert
Dr. Simon Pavamani	MBBS, MD	Professor, Radiotherapy, CMC, Vellore	Internal, Clinician
Dr. Rajesh Kannangai	MD, PhD.	Professor, Clinical Virology, CMC, Vellore	Internal, Clinician
Ms. Grace Rebekha	M.Sc., (Biostatistics)	Lecturer, Biostatistics, CMC, Vellore	Internal, Statistician
Mrs. Pattabiraman	BSc, DSSA	Social Worker, Vellore	External, Lay Person
Dr. Anuradha Rose	MBBS, MD, MHSC (Bioethics)	Associate Professor, Community Health, CMC, Vellore	Internal, Clinician
Dr. Balamugesh	MBBS, MD(Int Med), DM, FCCP (USA)	Professor, Pulmonary Medicine, CMC, Vellore	Internal, Clinician

Ethics Committee Blue, Office of Research, 1st Floor, Carman Block, Christian Medical College, Vellore, Tamil Nadu 632 002
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Dr. Biju George, M.B.B.S., MD., DM.,
Deputy Chairperson,
Secretary, Ethics Committee, IRB
Additional Vice-Principal (Research)

Dr. Santhanam Sridhar	MBBS, DCH, DNB	Professor, Neonatology, CMC, Vellore	Internal, Clinician
Mrs. Emily Daniel	MSc Nursing	Professor, Medical Surgical Nursing, CMC, Vellore	Internal, Nurse
Dr. Mathew Joseph	MBBS, MCH	Professor, Neurosurgery, CMC, Vellore	Internal, Clinician

We approve the project to be conducted as presented.

Kindly provide the total number of patients enrolled in your study and the total number of withdrawals for the study entitled: "Profile of occupation related ocular trauma- An observational study in a tertiary care referral institution" on a monthly basis. Please send copies of this to the Research Office (research@cmcvellore.ac.in).

Fluid Grant Allocation:

A sum of 3,000/- INR (Rupees Three Thousand Only) will be granted for 6 months.

Yours sincerely,

CHRISTIAN MEDICAL COLLEGE VELLORE INDIA
Dr. BIJU GEORGE
M.B.B.S., M.D.
SECRETARY - (ETHICS COMMITTEE)
Institutional Review Board,
Christian Medical College, Vellore - 632 002.

Dr. Biju George
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INITIAL SCREENING QUESTIONNAIRE

Name of patient–

ARE YOU A STUDENT/STAFF IN CMC VELLORE (YES/ NO)

Q1. Where did the eye injury occur?

a. at the place of work

b. at home while doing work (as source of employment)

c. outside home and workplace

Q2. When did the eye injury occur?

Specify-time and date

Q3. What is your age?

a. below 18 years

b. 18 years and above

OCCUPATION RELATED OCULAR TRAUMA STUDY (OOTS)

CLINICAL RESEARCH PROFORMA

S.No Date of presentation

PERSONAL DETAILS

Name: Hospital No

Age/ DOB:

Gender male/female

Occupation-

Agriculture related/others- (specify)
Contact no:

Mobile no:

DEMOGRAPHIC PROFILE

Address:

Village

Taluk

Reporting place: Ophthalmology OPD/Ophthalmology casualty

PLACE OF INJURY

Injury occurred at workplace- yes/no

(pl specify if work related circumstances)-_____

Time of injury: _ _ /_ _ am/pm

Date of injury: _ _/_ _/201

Have you received first-aid- yes/no

workplace/local hospital(doctor/ophthalmologist/others___)/tertiary hospital

No .of episodes of similar injuries in the past in the same workplace?

a) None
b) Once
c) 2 – 4 times
d) > 4 times

How long have you been working in your profession? _____ Months/ Years

Are you aware of eye protective devices?yes/no

Are there eye protective devices available for use at your workplace? Yes/no

Have you been using safety devices at the time of incident?
Yes/No/specify_____

Have you been using protective eye equipment at the time of incident? Yes/no

Previous occupational history

Sr. No.	Previous Job/Occupation	Duration of work
1.		
2.		
3.		

Eye injuries in the past

	Affected eye	Year	Occupation related(Y/N)	Mode of injury	Treatment(no/firstaid/medical/surgical)	Outcome(asymptomatic/impaired/low vision/no PL
1.						
2.						
3.						

CURRENT CAUSE/CIRCUMSTANCE OF INJURY AT WORKPLACE

• Flying Object/blunt object/sharp object/indeterminate object(Mechanical)	• Injury with stick/thorn/branch of tree/vegetative matter
• injury with stone	• Injury with cow tail
• Vehicle Accident/RTA	• Injury with metal/welding
• Sports	• Bull gore
• Fall	• Crackers at workplace
• Chemical Injury/corrosive gases/vapours	• Dust/mud
• Radiation injury	• Thermal
• Glass	• Housemaids with oil/masala splash
• Blast injuries	• Accidental- fist/finger/hand
• Others-	

VISUAL ACUITY AT PRESENTATION (UNAIDED)

VISION	**Right Eye (Affected/unaffected)**	**Left Eye (Affected/unaffected)**
At presentation Unaided		
With pinhole		

DETAILS OF INJURY

OCULAR EXAMINATION	RIGHT EYE	LEFT EYE
Orbit and adnexa		
Lids		
Conjunctiva		

Sclera		
Cornea		
Corneo-scleral tear		
Anterior chamber		
Iris		
Pupil		
IOFB		
Lens		
Intraocular pressure-normal/high/low/not assessed		
Vitreous		
Retina		
Optic Nerve		
Globe		

OPEN GLOBE INJURY

TYPE
A. Rupture B. Penetrating C. Intraocular foreign body D. Perforating E. Mixed

GRADE
(1).6/6-6/12 (2) 6/18 to 6/24 (3) 6/36 to 3/60 (4) 2/60-PL (5) No PL

PUPIL
1. Positive (RAPD+) 2.Negative

ZONE
1. Isolated to cornea(including corneoscleral limbus) 2. Corneoscleral limbus to a point 5 mm posterior into the sclera 3. Posterior to the anterior 5 mm of sclera

CLOSED GLOBE INJURY
TYPE
A. Contusion B. Lamellar laceration C. superficial foreign body D. Mixed

GRADE
(1).6/6-6/12 (2) 6/18 to 6/24 (3) 6/36 to 3/60 (4) 2/60-PL (5) No PL

PUPIL
1. Positive (RAPD+) 2. Negative(RAPD-)

2. ZONE

1. External(limited to bulbar conjunctiva, sclera, cornea) 2. Anterior segment (involving structures internal to cornea like AC,lens, posterior capsule, pars plicata) 3. . Posterior segment (pars plana and structures posterior to posterior lens capsule)

OCULAR TRAUMA CLASSIFICATION GROUP –

	RIGHT	LEFT
type of injury(OPEN/CLOSED)		
TYPE		
GRADE		
PUPIL		
ZONE		

OCULAR TRAUMA SCORE

OTS SCORE: _____ OTS SCORE CATEGORY: _____

Socio-economic status:
Education of patient: _____

Education of Head of household:
Occupation of Head of Household:
Average monthly income:_____
Family Income per month (in Indian Rs):_____

Socioeconomic class-

MANAGEMENT medical/surgical/both/none
Days of admission-

Details of medical management-

Details of primary surgical intervention

Not done/corneal tear suturing/sclera tear suturing/corneoscleral tear suturing/limbal tear suturing/iris reposition/iris excision/iris abscission/IOFB removal/lens matter aspiration/vitrectomy/intravitreal injection/AC tap/glue with or without contact lens/evisceration/enucleation/penetrating keratoplasty/others

Details of secondary intervention

Not done/LMA+-IOL/Retinal detachment surgery/glaucoma surgery/vitrectomy/others

VISUAL ACUITY ON FOLLOW UP

	Right Eye (Affected/unaffected)	**Left Eye (Affected/unaffected)**
At presentation Unaided		
1 month at followup Unaided BCVA		

Cause of low vision-
No of days of loss of work-
Did you quit your job/ change your line of work?

PATIENT INFORMATION SHEET

Eye injuries occuring while at work- An observational study in a referral eye hospital

Principal Investigator: Dr.Jophy Philips Cherry
Research Site: Schell Eye Hospital,Department of Ophthalmology
Christian Medical College

You are invited to be a part of this study. But before you decide to be a part of this study or not, it is important for you to understand why the research is being done and what it will involve. The information in this document will help you for the same.

1.What is the purpose of this study?

The purpose of this study is to evaluate the factors affecting work place related eye injuries and the visual outcome. If you agree to participate in this study, we will take the details of your wokplace, clinical examination, medical and surgical management in the ward. Following discharge, you will be required to come for review after 1 month. During followup, your vision will be checked and recorded.

2.If you take part, what will you have to do?

The study will be conducted during your visit to outpatient department or casualty.If you agree to take part in this study, you will be asked questions from a questionnaire. Your vision will be recorded on your follow up visit at 1 month.

3.Are there any risks for you if you take part in this study?

There are no risks associated with this study. You might need to spend some extra time in providing details about yourself and your workplace environment. There is no risk/additional risk that can be attributed to the nature of your eye condition or with the treatment.

4.What are the benefits if you take part in this study?

The study aims to get an insight about the nature and circumstances of workplace related eye injuries.The results may provide information about the safety standards available at workplace, awareness regarding the same, knowledge,attitude and practice regarding use of protective eye wear,

5.Do you have to pay ?

You will have to pay for the tests that are required for the routine management of your eye condition. There are no additional costs involved for conducting the study. Participants will not be paid for taking part in the study.

6.What if I don't want to take part in this study or if I want to withdraw later ?

Your participation in this study is voluntary and you are free to withdraw at any point should you desire to do so. Even if you decide to withdraw, there will be no alteration/change in your treatment plan. The team of doctors will still take care of you to the best of their abilities. You will not be denied of medical care, services, or benefits for which you are entitled to,at this hospital.

7.What if something goes wrong?

You will not suffer any complications as a result of this study. No additional investigations/procedures will be carried out as part of this study.

8.Will your personal details be kept confidential?
The results of the study may be published in a medical journal, but you will not be identified by name in any publication or presentation of results. However, your medical records may be reviewed by people associated with your study.

If you have any further queries, you may contact Dr. Jophy Philips Cherry
Tel: 0416 3071201
Mobile no: 8489028772
Email: jophy_philips@yahoo.co.in

Thank you for taking time to consider being a part of this study .If you wish to take part, please sign the attached consent form. This information sheet is for you.

INFORMATION SHEET FOR CARETAKER

Eye injuries occuring while at work- An observational study in a referral eye hospital

Principal Investigator: Dr.Jophy Philips Cherry
Research Site: Schell Eye Hospital,Department of Ophthalmology

Dear Sir/Madam,

We are doing a study to evaluate the factors affecting vision in work place related eye injuries. We would like to tell you in brief about the study. If you agree to participate in this study(on behalf of the patient), we will take the details of the patients clinical examination, surgical intervention and treatment in the ward. You will also be asked questions from a questionnaire, which you can answer on the patients behalf, if the patient is unable to answer. Following discharge, the patient is required to come for review after 1 month. During followup, the vision of the patient will be recorded. There will not be any additional costs to the patient by participating in the study. There will be no additional risks for the patient by participating in this study. The patient will have to pay for the tests that are required for the routine management of his/her eye condition. Patients will not be paid for taking part in the study.
Participation in this study is voluntary and the patient is also free to decide to withdraw permission to participate in this study. This will not affect the patients treatment in this hospital. The names or identity of the patients will not be published. The hospital records will be kept confidential in the Department of Ophthalmology. Interested patients can be briefed about the results of the study. However, the medical records of the patients may be reviewed by people associated with the study.

For any queries, please contact Dr. Jophy Philips Cherry
Tel: 0416 3071201
Mobile no: 8489028772
Email: jophy_philips@yahoo.co.in

Thank you for taking time to consider being a part of this study .If you wish to take part on behalf of the patient, please sign the attached consent form. This information sheet is for you.

Informed Consent form to participate in a research study
Study Title: Profile of occupation related ocular trauma - An observational study in a tertiary care referral institution.
Study Number: _____
Subject's Initials: _____ Subject's Name:
_____
Date of Birth / Age: _____
Subject- Consent for participating in the open globe injury study

I. I confirm that I have read and understood the information sheet dated _____ for theabove study and have had the opportunity to ask questions. [ ]
II. I understand that my participation in the study is voluntary and that I am free to withdraw atany time, without giving any reason, without my medical care or legal rights being affected. [ ]
III. I understand that the Ethics Committee and the regulatory authorities will not need my permission to look at myhealth records both in respect of the current study and any further research that may beconducted in relation to it, even if I withdraw from the trial. I agree to this access. However, Iunderstand that my identity will not be revealed in any information released to third parties orpublished. [ ]
IV. I agree not to restrict the use of any data or results that arise from this study provided such ause is only for scientific purpose(s). [ ]
V. I agree to take part in the above study. [ ]

Signature (or Thumb impression) of the Subject/Legally Acceptable

Date: _____/_____/_____
Signatory's Name: _____ Signature:
Or
Representative: _____
Date: _____/_____/_____
Signatory's Name: _____
Signature of the Investigator: _____
Date: _____/_____/_____
Study Investigator's Name: _____
Signature or thumb impression of the Witness: _____
Date: _____/_____/_____
Name & Address of the Witness: _____

MODIFIED KUPPUSWAMY SCALE-

The socioeconomic status (SES) is a crucial factor influencing the health aspect of an individual or a family and therefore the country. One of the scales popularly used is the Kuppuswamy scale. The scale has been widely used for over 3 decades as a measure of socioeconomic status.

MODIFIED KUPPUSWAMY SCALE

A. Education	
Professors or honours	7
Graduate or post graduate	6
Intermediate or post high school diploma	5
High school certificate	4
Middle school certificate	3
Primary school certificate	2
Illiterate	1
Professors or honours	7
Graduate or post graduate	6
Intermediate or post high school diploma	5
High school certificate	4
Middle school certificate	3
Primary school certificate	2
Illiterate	1
B. Occupation	
Profession	10
Semi-profession	6
Clerical, shop-owner, farmer	5
Skilled worker	4
Semi-skilled worker	3
Unskilled worker	2
Unemployed	1
C. Family income per month in Rs. (2015)	
40,635	12
20317-40634	10
15200-20316	6
10158-15199	4
6095-10157	3
2034-6094	2
2033	1
Socio-economic class	
Upper (I)	26-29
Upper middle (II)	16-25
Lower middle (III)	11-15
Upper lower (IV)	5-10
Lower (V)	<5

தகவல் பிரதி

வேலை செய்யும் இடத்தில் ஏற்படும் கண் காயாங்கள்:
கண் மருத்துவமனையின் நோக்குதற்குரிய ஆய்வு

முதன்மை ஆய்வாளர் : டாக்டர் நோ.:ப்பி பினிப் செர்ரி

ஆய்வு நடத்தும் இடம் : மைல் கண் மருத்துவமனை
கண் மருத்துவ தூணை
கிருஸ்தவ மருத்துவ கல்லூரி

உங்களை இந்த ஆய்வில் பங்கு பெற அணிதக்கிறோம். இந்த தாளில் உள்ள தகவல்களை நீங்கள் படித்தறிந்தபின் இந்த ஆய்வில் பங்கு பெறலாமா? வேண்டாமா என்று நீங்கள் முடிவு செய்யலாம். இது தொடர்பான கேள்விகள் மற்றும் சந்தேகங்களை நீங்கள் எங்களிடம் தயக்கமின்றி தெரிவிக்கலாம்.

1. இந்த ஆய்வின் நோக்கம் :- இந்த ஆய்வின் நோக்கம் எண்ணவென்றால், வேலை செய்யும் இடத்தில் ஏற்படும் கண் காயங்களால் ஆன பாதிப்பு மற்றும் பார்வையில் ஏற்படும் விளைவுகள் பற்றி மதிப்பீடு செய்யப்படும். நீங்கள் இந்த ஆய்வில் பங்கேற்க ஆர்வுக் கொண்டால் நீங்கள் வேலை செய்யும் இடம் பற்றிய விவரம், மருத்துவப் பரிசோதனை, மருத்துவம் மற்றும் அறுவை சிகிச்சை முலமாய்

நோயைக் கடுப்படுத்துதல் இந்த விவரங்கள் பெறப்படும். மேலும் மருத்துவமனை சிகிச்சையில் இருந்து விடுவிக்கப்பட்ட பிறகு, ஒரு மாதம் கழித்து உங்களை அணுகி, உங்கள் பார்வையை பரிசோதனை செய்து அதன் விவரங்கள் பதிவு செய்யப்படும்.

2) இந்த ஆய்வில் பங்கேற்க வேண்டும் என்றால் நீங்கள் என்ன செய்ய வேண்டும்?

இந்த ஆய்வு வெளி நோயாளி பிரிவு அல்லது அவசர சிகிச்சைப் பிரிவின் வருகையின் போது நடத்தப்படும். நீங்கள் பங்கேற்க ஒப்புக் கொண்டால், ஒரு சில கேள்விகள் உங்களிடம் கேட்கப்படும். ஒரு மாதம் கழித்து உங்கள் பார்வையை பரிசோதனை செய்து பதிவு செய்யப்படும்.

3) நீங்கள் இந்த ஆய்வில் பங்கேற்பதால் ஆபத்து ஏதும் உள்ளதா?

இந்த ஆய்வுத் தொடர்புடையதான எந்த ஒரு அபாயமும் இல்லை. ஆனால், உங்களைப் பற்றியும் உங்கள் பணியிட சூழல் பற்றிய விவரங்களை எங்களுக்கு அளிப்பதில் சில கூடுதல் நேரங்களை எங்களுடன் செலவிட வேண்டும். உங்களின் கீயெம்பான கண் நிலை அல்லது சிகிச்சையின் காரணமாகவோ

ஆபத்து / கேடுதல் ஆபத்து ஏதும் ஏற்படாது.

4) இந்த ஆய்வில் பங்கேற்பதால் என்ன நன்மைகள் கிடைக்கும் ?

இயற்கையான அல்லது பணியிடத்தில் ஏற்படும் கண் காயங்களின் தாக்கங்கள் பற்றிய ஒரு பார்வை / அலசல் மற்ற முயற்சிக்கிறோம்.

ஆய்வின் முடிவு ; பணியிடத்தில் தேவைப்படும் பாதுகாப்புத் தரம், விழிப்புணர்வு, அறிவு, அணுகுமுறை மற்றும் கண் பாதுகாப்புக்கான கண் உடைகளின் பயன்பாடு போன்ற மருத்துவத் தேவை தொடர்பான விழிப்புணர்வு பற்றிய தகவல் மற்ற முடியும்.

5) நீங்கள் பணம் ஏதும் செலுத்த வேண்டுமா ?

உங்கள் கண் நோய்கள் சிகிச்சைக்கு அத்தியாவசிய-மான பரிசோதனைகளுக்கு மட்டுமே நீங்கள் பணம் செலுத்த வேண்டும். இந்த ஆய்வு நடத்துவதற்கு எந்த கேடுதல் செலவும் இல்லை. இந்த ஆய்வில் பங்கேற்பவர்கள், இந்த ஆய்வுக்காக எந்த பணமும் செலுத்த தேவையில்லை.

6) இந்த ஆய்வில் பங்கு பெற விருப்பம் இல்லையென்றால் நான் விலகிக் கொள்ள முடியுமா? அல்லது பங்கேற்றப்பின் விலகலாமா?

நீங்கள் இந்த ஆய்வில் பங்கேற்பது முழுவது உங்களின் விருப்பத்தின் பேரில் தான் என்றும், பங்கேற்ற பின் எந்த நேரத்திலும் உங்கள் விருப்பப்படி விலக்கி கொள்ளலாம். நீங்கள் இந்த ஆய்வில் விலக்கி கொண்டாலும் அது உங்கள் கண் நோய்க்கு இந்த மருத்துவமனையில் அளிக்கப்படும் வழக்கமான சிகிச்சையை எந்த விதத்திலும் பாதிக்காது. மருத்துவர்கள் தரும் தான் முழு தீர்மானம் உங்களின் சிகிச்சை ~~தீர்மானம்~~ கொடுப்பார்கள். இந்த மருத்துவமனையில் உங்களுக்கு வழங்கப்படும் மருத்துவ பராமரிப்பு, சேவைகள் மற்றும் நன்மைகள் ~~உம்~~ வழங்காமல் இருக்க முடியாது.

7) இந்த ஆய்வின் போது தவறு ஏதாவது நடந்தால்?

இந்த ஆய்வின் முடிவுகள் உங்களை எந்த விதத்திலும் பாதிப்புக்குள்ளாகாது. மேலும் கருத்தம் விசாரணைகள்/ ஆய்முறைகள் அல்லது நடைமுறைகள் இந்த ஆய்வின் ஒரு பகுதியாக இருக்காது.

8) உங்களின் தனிப்பட்ட விவரங்களை ரகசியமாக/ பாதுகாப்பாக வைக்கப்படுமா?

இந்த ஆய்வின் முடிவுகள் மருத்துவ பத்திரிக்கைகளில்

வெளியிடப்படலாம். ஆனால் உங்கள் பெயரோ, தனிப்பட்ட விவரமோ எந்த விஷயத்திலும் வெளியிடப்படமாட்டாது. எல்லாரும் இந்த ஆய்வில் பங்கு பெற்றால் உங்கள் மருத்துவ விவரங்கள் உங்கள் அனுமதியின்றி, ஆய்வு தொடர்பான அதிகாரிகளால் மதிப்பாய்வு செய்யப்படும்.

உங்களுக்கு மேலும் ஏதேனும் சந்தேகங்கள் இருந்தால் டாக்டர் ஜோ. ப்பி பிலிப்ஸ் எனர் என்பவரை தொடர்பு கொள்ளவும்

தொலைபேசி எண் : 0416 307 1201
மின் அஞ்சல் : jophy_Philips@yahoo.co.in

இந்த ஆய்வின் ஒரு பகுதியாக, நீங்கள் எங்களுடன் நேரம் செலவிட்டதற்கு நன்றி. நீங்கள் பங்கேற்க விரும்பினால் தங்களுடைய உள்ள ஒப்புதல் படிவத்தில் கையெழுத்திட வேண்டும்.

தலைப்பு :- வேலை செய்யும் இடத்தில் ஏற்படும் கண் காயங்கள் - கண் மருத்துவமனையின் நோக்குதற்குரிய ஆய்வு

ஆய்வில் பங்கேற்பதற்கான தகவலறிந்த ஒப்புதல் வடிவம்

ஆய்வு எண்: _____

ஆய்வில் பங்கு பெறுபவரின் முன்னெழுத்துக்கள் (*Initials*): _____

ஆய்வில் பங்கு பெறுபவரின் பெயர்: _____

பிறந்த தேதி / வயது: _____

1 _____ தேதி அன்று நான் மேற்கூறிய ஆய்விற்கான தகவல் தாளைப் படித்து அதை புரிந்துகொண்டேன் என்று உறுதி அளிக்கிறேன். அது தொடர்பான கேள்விகள் கேட்க எனக்கு முழு வாய்ப்பு இருந்தது.

2 இந்த ஆய்வில் கலந்து கொள்வது ஒரு கட்டாயம் இல்லை என்பதையும், எந்த நிலையிலும் நான் இந்த ஆய்விலிருந்து எந்த காரணமும் அளிக்காமல் விலகிக்கொள்ளலாம் என்பதையும் நான் அறிவேன்.

3 இந்த ஆய்வை நடத்தும் அதிகாரிகள், மற்றும் இது தொடர்பான பிற அதிகாரிகள் என்னுடைய மருத்துவ விவரங்களை எனது அனுமதி இல்லாமலே கையாள உரிமை உள்ளவர்கள் என்பதை நான் அறிவேன். ஒரு வேளை நான் இந்த ஆய்வில் இருந்து விலகிக்கொண்டாலும் இது பொருந்தும் என்பதையும் நான் அறிவேன். இதற்கு நான் ஒப்புதல் அளிக்கிறேன். ஆனால் எதன் மூலம் என்னுடைய அடையாளம் வெளியாட்களுக்குத் தெரிவிக்கப்படமாட்டாது என்பதை அறிவேன்.

4 இந்த ஆய்வினால் வெளிவரக்கூடிய தகவல்கள் மற்றும் விளைவுகளை அறிவியல் காரணங்களுக்காகப் பயன்படுத்துவதை நான் தடுக்க மாட்டேன்.

5 மேற்கூறிய ஆய்வில் பங்குகொள்ள நான் ஒப்புதல் அளிக்கிறேன்

ஆய்வில் பங்கு பெறுபவரின் கையொப்பம் (அல்லது கைதாட்டை):

தேதி: _____ / _____ / _____

பெயர்: _____
கையொப்பம்:

அல்லது

பிரதிநிதி: _____

தேதி: _____ / _____ / _____

பெயர்: _____

ஆய்வு ஆராய்ச்சியாளரின் கையொப்பம்: _____

தேதி: _____ / _____ / _____

ஆய்வு ஆராய்ச்சியாளரின் பெயர்: _____

சாட்சி கையொப்பம்: _____

தேதி: _____ / _____ / _____

சாட்சியின் பெயர் & முகவரி: _____

நோயாளியின் காப்பாளருக்கான தகவல் தாள்

ஆய்வின் தலைப்பு : வேலை செய்யும் இடத்தில் ஏற்படும் கண் காயங்கள் - கண் மருத்துவமனையின் நோக்குதற்குரிய ஆய்வு

முதன்மை ஆய்வாளர் : டாக்டர் ஜோப் பிலிப்ஸ் சென்ரி

ஆய்வு நடத்தும் இடம் : மைஸ் கண் மருத்துவமனை
கண் மருத்துவத் துறை

அன்புள்ள ஐயா / அம்மா,

நாங்கள் மேற்கொள்ளும் ஆய்வைக் குறித்து சுருக்கமாக சொல்ல விரும்புகிறோம். அதாவது நாம் வேலை செய்யும் இடத்தில் கண் காயங்களால் ஏற்படும் பார்வை பாதிப்பை மதிப்பீடு செய்ய ஒரு ஆய்வு நடத்த உள்ளோம்.

நீங்கள் (நோயாளி சார்பாக) பங்கேற்க விரும்புகிறீர்கள். நோயாளிக்கு மருத்துவமனையில் அளிக்கப்படும் மருத்துவ பரிசோதனை, அறுவை சிகிச்சை முறை மற்றும் சிகிச்சை அளிக்கும் விவரங்களை பதிவு செய்வோம் / பெறப்படும்.

நோயாளிகளிடம் ஒரு சில கேள்விகள் கேட்கப்படும். அப்பொழுது நோயாளி பதில் சொல்ல முடியவில்லை யென்றால், நோயாளி சார்பாக நீங்கள் பதிலளிக்க முடியும். நோயாளி மருத்துவமனையில் தங்கி சிகிச்சைப் பெற்று சென்ற பின்பு ஒரு மாதம் கழித்து தொடர் சிகிச்சைக்கு உங்களை அழைத்து உங்கள் பார்வையை பரிசோதனை செய்து, அதின் விவரங்கள் பதிவு செய்யப்படும். இந்த ஆய்வில் பங்கேற்பதால் எந்த ஒரு ஆபத்தும் / அபாயமும் ஏற்படாது. உங்கள் வழிக்கமான கண் நோயின் சிகிச்சைக்கு தேவையான அத்தியாவசியமான பரிசோதனைகளுக்கு மட்டுமே நீங்கள் பணம் செலுத்த வேண்டும். இந்த ஆய்வில்

பங்கேற்பதற்கு எந்த பணமும் கட்டணமாக செலுத்த வேண்டிய அவசியம் இல்லை. நீங்கள் இந்த ஆய்வில் பங்கேற்பது என்பது உங்களின் விருப்பத்தின் பேரில் தான் என்றும், பங்கேற்ற பிறகு எந்த நேரத்திலும் உங்கள் விருப்பப்படி விலகிக் கொள்ளலாம். அப்படி விலகும் பட்சத்தில் உங்கள் கண் நோய்க்கு இந்த மருத்துவமனையில் அளிக்கப்படும் வழக்கமான சிகிச்சையில் எந்த விதமான பாதிப்பும் இருக்காது. இந்த ஆய்வில் உங்கள் பெயரோ, தனிப்பட்ட விவரமோ வெளியிடப்படாது. கண் மருத்துவ குழுவில் இந்த ஆய்வின் விவரங்கள் பாதுகாப்பாக வைக்கப்படும். இந்த ஆய்வின் முடிவுகளை ஆர்வமுள்ள நோயாளர்கள் அறிந்து கொள்ள முடியும். எல்லாம் பங்கேற்கும் நோயாளிகளின் மருத்துவ விவரங்களை இந்த ஆய்வுத் தொடர்புடைய அதிகாரிகளால் பரிசீலனை செய்யப்படும்.

மேலும் விவரங்களுக்கு தயவு செய்து டாக்டர் ஜோய். பி. பிலிப்ஸ் சேர்ந்த எண்பவரை தொடர்பு கொள்ளவும்

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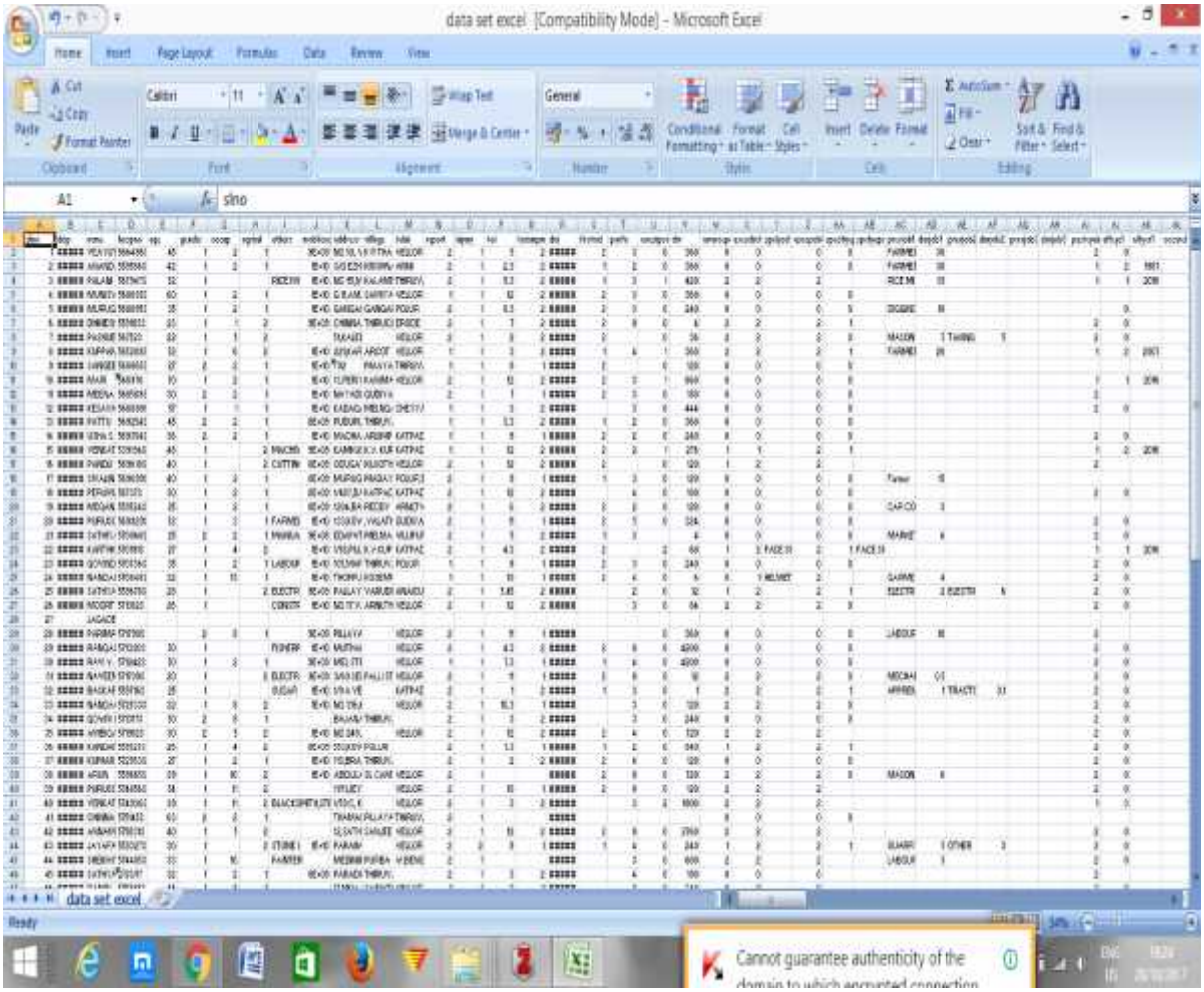
இந்த ஆய்வின் ஒரு பகுதியாக நீங்கள் எங்களுடன் நேரம் ஒதுக்கியதற்கு நன்றி. நீங்கள் (நோயாளர் சார்பாக) பங்கேற்க விரும்பினால் தகவல் தாளோடு உள்ள ஒப்புதல் படிவத்தில் கையெழுத்திட வேண்டும்.


data set excel [Compatibility Mode] - Microsoft Excel
Home
Insert
Page Layout
Formulas
Data
Review
View
Cut
Copy
Format Painter
Paste
Calibri
11
Wrap Text
Merge & Center
General
Conditional Formatting
Format as Table
Cell Styles
Insert
Delete
Format
AutoSum
Fill
Clear
Sort & Filter
Find & Select
A1
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data set excel
Ready
Cannot guarantee authenticity of the